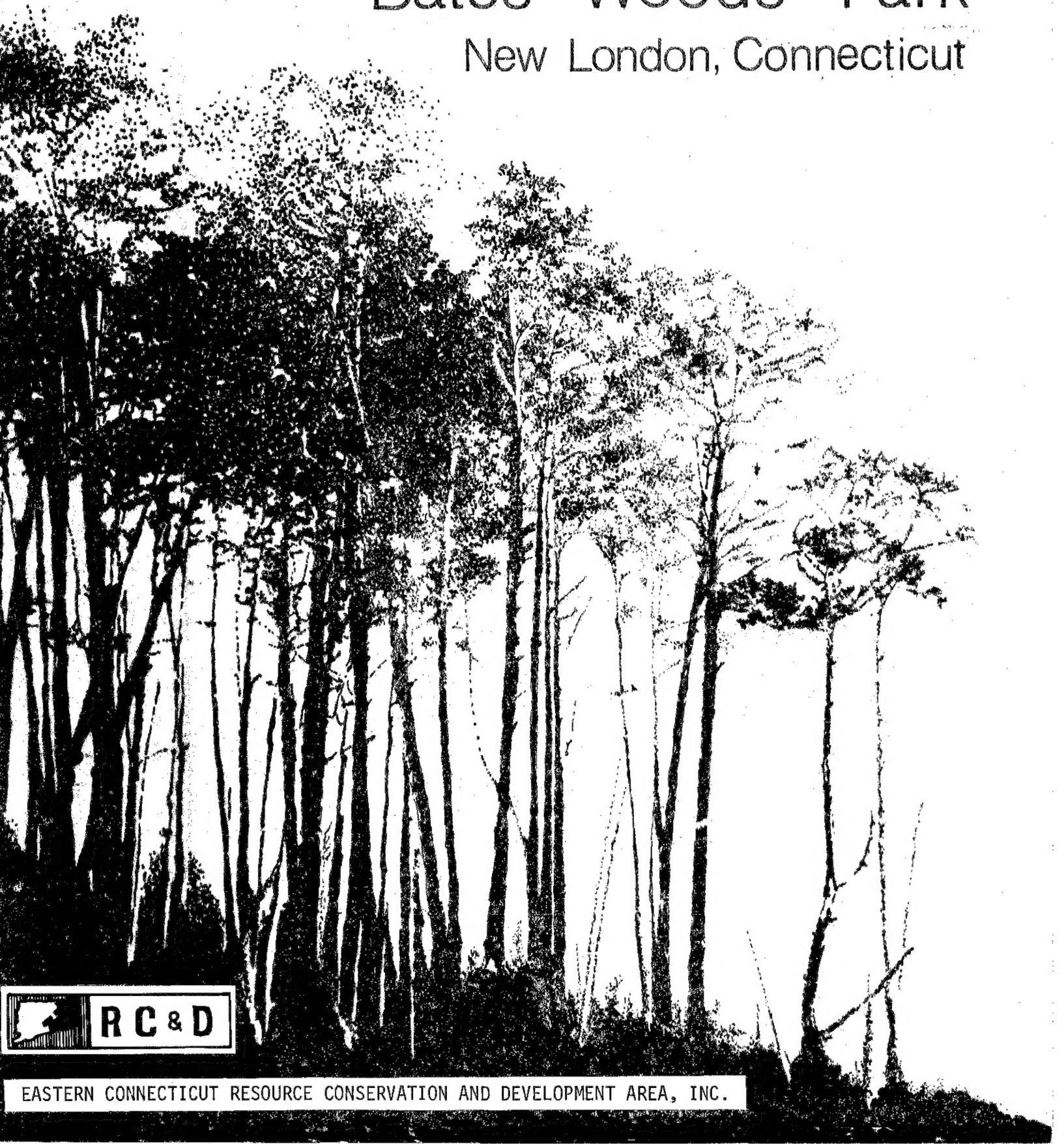


Environmental Review Team Report

Bates Woods Park

New London, Connecticut



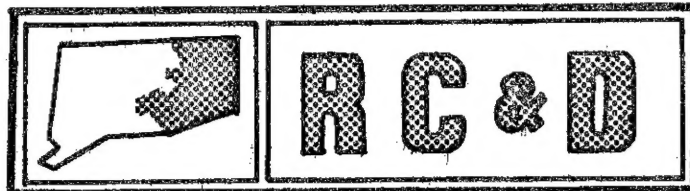
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team
Report
on

Bates Woods Park

New London, Connecticut

November 1979

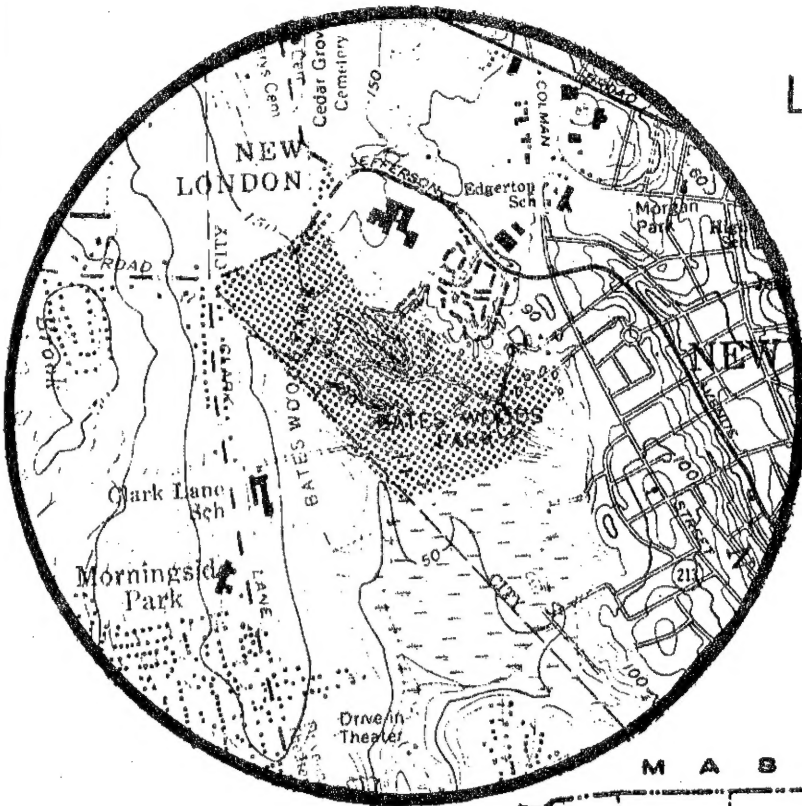


eastern connecticut resource conservation & development area

environmental review team
139 boswell avenue
norwich, connecticut 06360

Location of Study Site

BATES WOODS PARK
NEW LONDON, CONNECTICUT



ENVIRONMENTAL REVIEW TEAM REPORT
ON
BATES WOODS PARK
NEW LONDON, CONNECTICUT

This report is an outgrowth of a request from the New London City Manager to the New London County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the Eastern Connecticut Resource, Conservation and Development (RC&D) Area Executive Committee for their consideration and approval. The request was approved and the measure was reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist from the United States Department of Agriculture, Soil Conservation Service (SCS). Reproductions of the soil survey map, a table of soils limitations for certain land uses and a topographic map showing property boundaries were distributed to all Team members prior to their review of the site.

The ERT that field-checked the site consisted of the following personnel: Gary Domian, District Conservationist, SCS; Rob Rocks, Forester, Connecticut Department of Environmental Protection (DEP); Michael Zizka, Geologist, DEP; Andy Petracco, Recreation Specialist, DEP; Ralph Lewis, Geologist, Solid Waste Management, DEP; Jim Murphy, Ecologist, Water Compliance, DEP; Ken Metzler, Wetland Ecologist, DEP; Joan Zaprzalka, Regional Planner, Southeastern Connecticut Regional Planning Agency; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field checked the site on Thursday, August 30, 1979. Reports from each contributing Team member were sent to the ERT Coordinator for review and summarization for the final report.

This report is not meant to compete with private consultants. As requested by the City, this report, which identifies the existing resource base of the Bates Woods Park, shall constitute the environmental assessment portion of the City's open space application for Federal Department of the Interior, Heritage Conservation and Recreation Service funds to assist in the acquisition of this property.

The Eastern Connecticut RC&D Area Committee hopes that this report will be of value and assistance in making any decisions regarding this particular site.

If you require any additional information, please contact: Ms. Jeanne Shelburn, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.

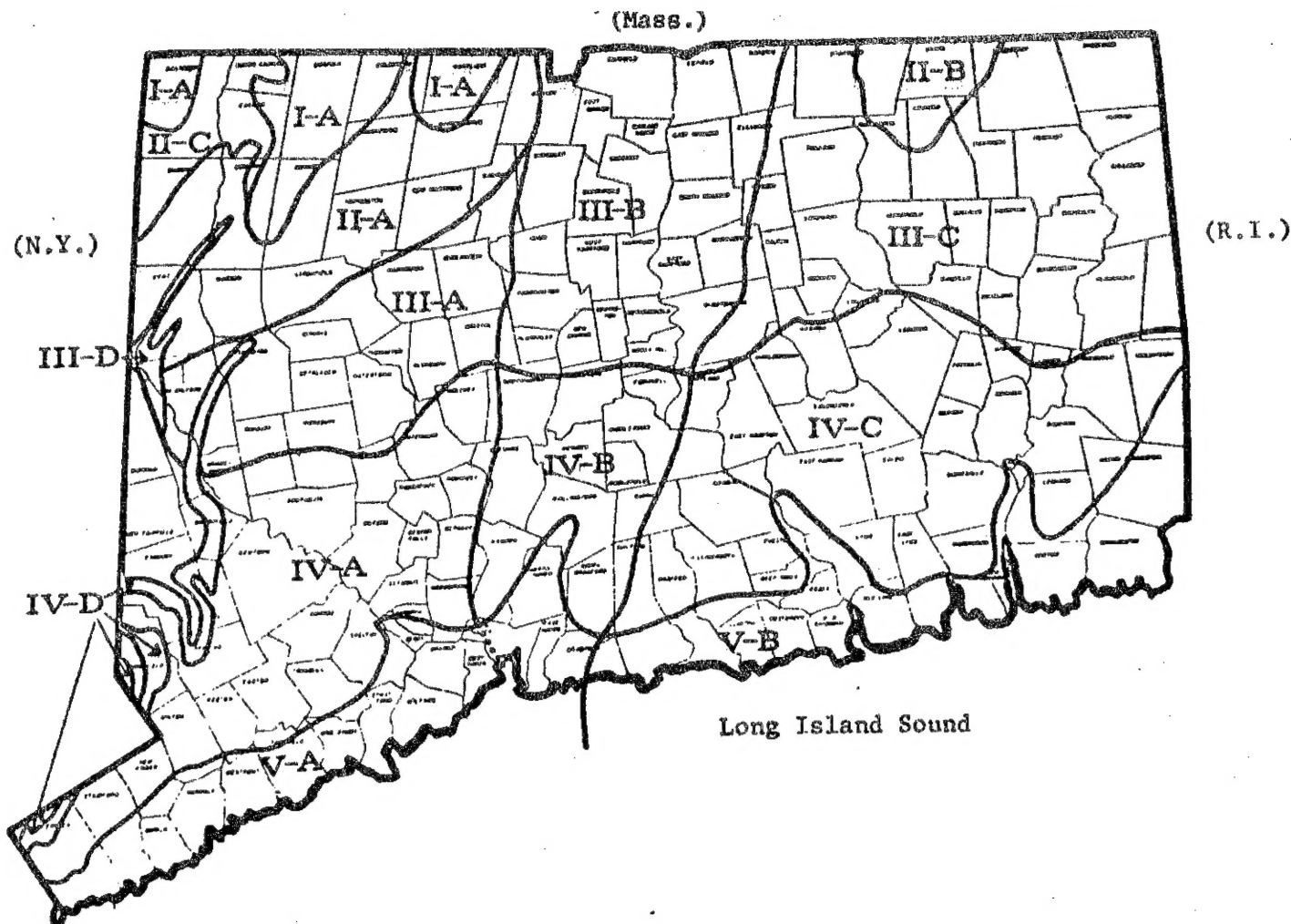


Fig. 1 Ecoregions of Connecticut

- I. Northwest Highlands-Northern Hardwoods zone
 - A. Northwest Highlands ecoregion
- II. Northern Uplands-Transitional Hardwoods zone
 - A. Northwest Uplands ecoregion
 - B. Northeast Uplands ecoregion
 - C. Northern Marble Valley
- III. Northern Hills-Central Hardwoods-White Pine zone
 - A. Northwest Hills ecoregion
 - B. North-Central Lowlands ecoregion
 - C. Northeast Hills ecoregion
 - D. Central Marble Valley
- IV. Southern Hills-Central Hardwoods zone
 - A. Southwest Hills ecoregion
 - B. South-Central Lowlands ecoregion
 - C. Southeast Hills ecoregion
 - D. Southern Marble Valley
- V. Coastal Hardwoods zone
 - A. Western Coastal ecoregion
 - B. Eastern Coastal ecoregion

Source: Dowhan, Joseph J. and Robert J. Craig, Rare and Endangered Species of Connecticut and Their Habitats, State Geological and Natural History Survey of Connecticut, Natural Resources Center, DEP, 1976; pg. 26.

DESCRIPTION OF THE PROPOSAL

The City of New London is proposing to expand recreation facilities in the existing Bates Woods Nature Center, located on Chester Street. The City plans to apply for HCRS (Heritage, Conservation and Recreation Service) development funding assistance. A report prepared by Raymond, Parrish, Pine and Weiner, Inc. in August 1977 outlined several plan concepts for future development of the interior portion of the park. The City Recreation and Parks Department has adopted a modification of Plan "A", shown in that report, for future development.

The site is approximately 85 acres of woodland. At present a zoo, picnic area, and baseball field are located in the northeastern section of the property. A solid waste landfill, a small pond, and Fenger Brook are all located in the southeastern section. It is this section which is proposed for the major development, including baseball fields, tennis courts, picnic areas, and a possible soccer field. In order to apply for HCRS funding, the landfill must be closed in accordance with State Solid Waste Management regulations. This closure procedure may prove costly in this instance, as proper compaction of the landfill seems to have been neglected.

Although Bates Woods Park is several miles inland from Long Island Sound, it is considered to be within the Eastern Coastal Hills Ecoregion of the Connecticut Coastal Hardwood Zone (see accompanying illustration). Ecoregions have been defined as areas characterized by a distinctive pattern of landscapes and regional climate as expressed by the vegetation composition and pattern and the presence or absence of certain indicator species or species groups (Dowhan & Craig 1976). In the Eastern Coastal Hills Ecoregion, the proximity of Long Island Sound has a moderating influence on the nearshore climate which controls the kind and number of plant species. Conspicuous sea breezes, penetrating 5-10 miles inland, produce a warming trend in the fall and winter months and a cooling effect in the spring and summer.

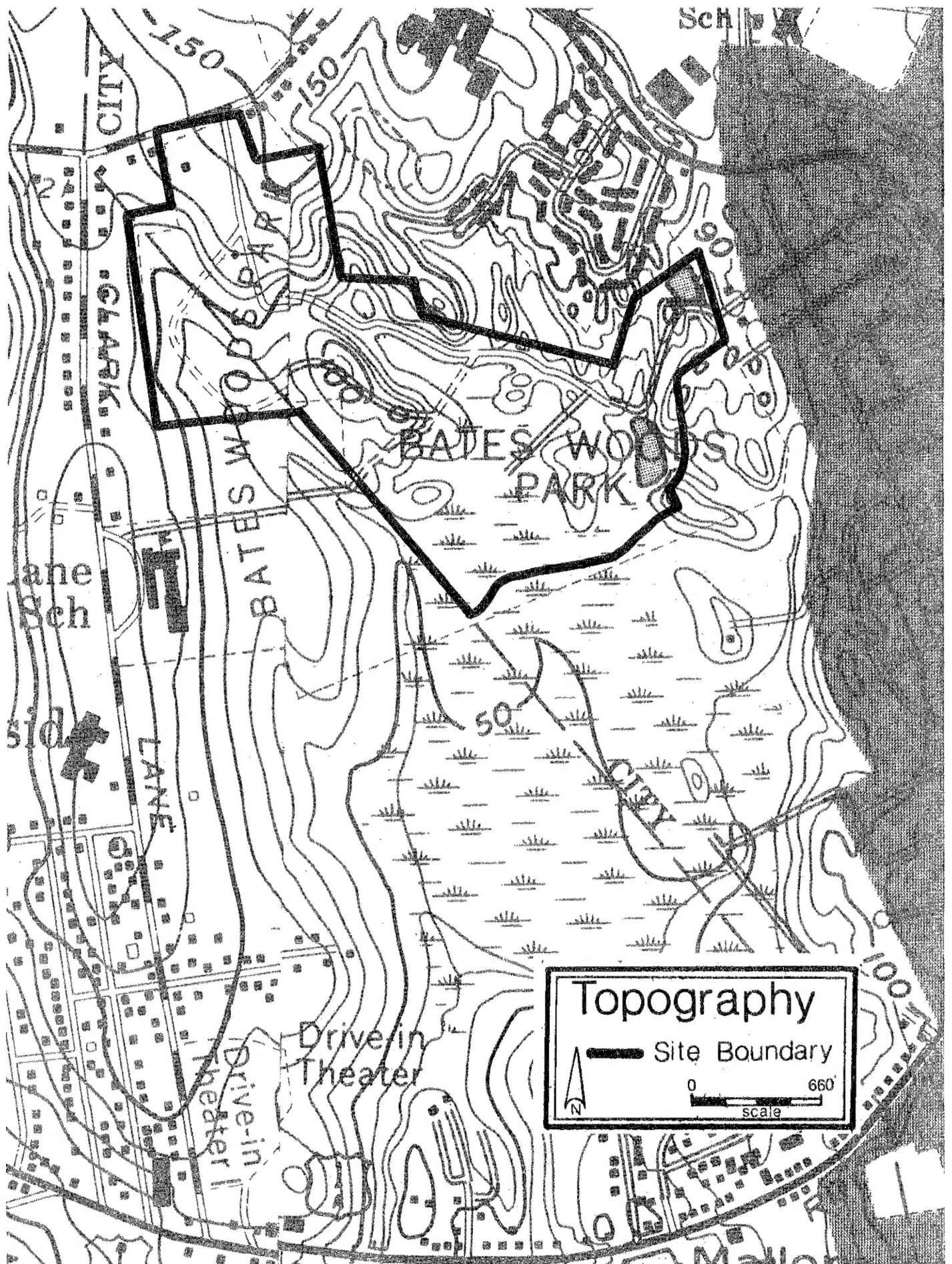
Bates Woods Park consists primarily of a series of irregular bedrock ridges covered with a mantle of glacial till. There is a wide variety in habitat conditions, ranging from dry bedrock ridges to wet swamps. Although only the wetlands were examined in detail (see below), a general description of the upland vegetation can be obtained in the appendix.

Further recreational development of available land in Bates Woods Park is in agreement with New London's Comprehensive Development Plan.

DESCRIPTION OF THE ENVIRONMENT

PRESENT/PAST LAND USES

Bates Woods has been set aside as park land for the City of New London for approximately 50 years. Evidence of stone fireplaces, picnic benches, bridges, and warming huts constructed with W.P.A. funding is still found on park grounds, although vandalized in recent years.



Existing recreational facilities in the northern section of Bates Woods Park are a zoo, picnic areas, pavilion, baseball diamond, and a playground. Plans for the undeveloped portion of the park include the creation of nature trails, outdoor study areas, and playing fields. The land area is suited for nature trails, open space, and outdoor study areas. Development of playing fields may present some problems as a result of site limitations. The entire park area is currently zoned for low-density residential development. Surrounding land is zoned for low- and moderate-density residential purposes, except to the south where a light industrial use zone exists. Further recreational development of the area is compatible with current land use zoning. A well-planned and attractive park would most likely enhance neighboring property values.

SOCIO-ECONOMIC CONDITIONS

Further recreational development of Bates Woods Park concurs with one goal of New London's Comprehensive Development Plan, which is to create additional park and recreational acres for use by a growing city and regional population. The State Office of Policy and Management and the Southeastern Connecticut Regional Planning Agency projections predict that the population of New London will be 34,000 by the year 2000, an increase of 7.5% over 1970 census figures, and Waterford's population is expected to increase at a much faster rate.

EXISTING TRAFFIC PATTERNS

Access to Bates Woods is presently from Chester Street to the north (the main entrance) and Ashcraft Road on the east. A moderate increase in traffic to and from the park should pose no significant problems to current traffic patterns on either entrance street. A fair amount of traffic to and from the park will probably be by foot or bicycle and access via these modes of transportation should be encouraged.

SURFACE/SUBSURFACE GEOLOGIC CHARACTERISTICS

Bates Woods Park is located within the New London and Niantic topographic quadrangles. The surficial and bedrock geology of those quadrangles have been mapped by Richard Goldsmith and published by the U.S. Geological Survey (maps GQ-176, New London surficial; GQ-329, Niantic surficial; GQ-574, New London bedrock; and GQ-575, Niantic bedrock). An updated surficial geologic map of the park site, modified from GQ-176 and GQ-329, is provided in this report.

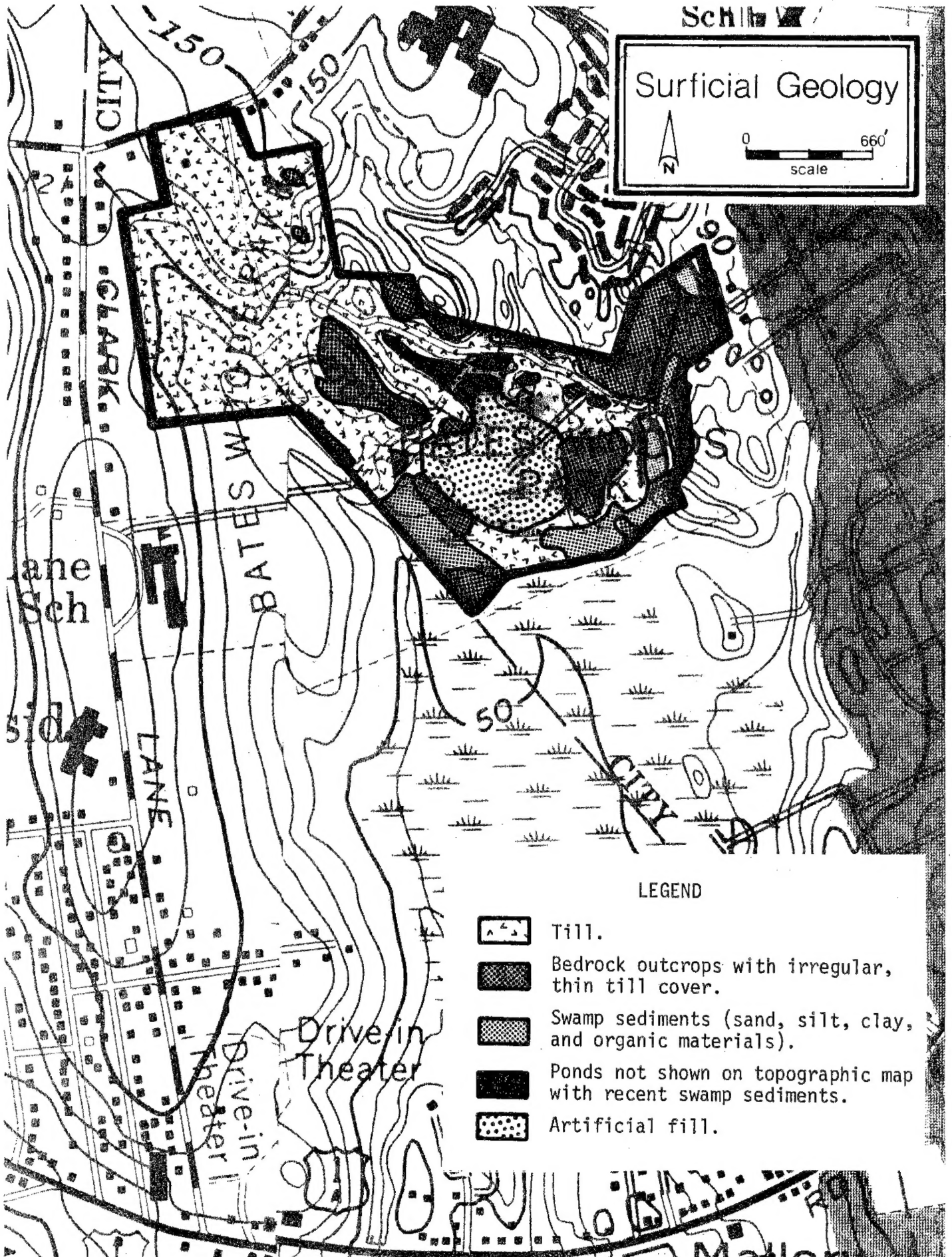
Bedrock, which crops out extensively in the park, has been classified as a unit of the New London Gneiss. This unit may be described as a light gray, medium- to fine-grained gneissic granodiorite or quartz monzonite. "Granodiorite" is a term indicating the typical mineralogic make-up of the rock: quartz and oligoclase are major constituents; microcline is subordinate; biotite, magnetite, and amphibole are accessory. "Quartz monzonite" is a mineralogic term that indicates a higher ratio of microcline to oligoclase than does granodiorite. "Gneissic" is a textural-structural term for a rock in which platy or elongate minerals and rounder minerals form thin, alternating bands. New London Gneiss has been quarried for use as rip-rap and building stone.

Schiller

Surficial Geology



0 660'
scale



The bedrock is discontinuously overlain by a thin deposit of glacial sediment known as till. Till consists largely of rock particles of all shapes and sizes. These particles were picked up or broken off from the preexisting land surface by active glacier ice, and were later redeposited from the ice without subsequent transport by meltwater. Textures range from compact and silty-sandy to loose and granular.

In the southern part of the site, till or bedrock is overlain by swamp deposits and/or artificial fill. Swamp deposits consist of silt, clay, sand, and organic materials that settled to the bottom of a sluggish or stagnant water body. Artificial fill on the site consists of bulky waste products and earth materials.

SOILS

The soils in the park area occupy northwest-oriented hills. The hills are dominantly underlain by bedrock and are covered with a thin mantle of glacial till. A drainage basin occurs within the westerly portion of the park and drains south-east off the property into the headwaters of Fenger Brook. The southernmost section of the park is dominated by mucky organic soils that blend into wet mineral soils to the north. The wet mineral soils are found in the low depressional areas between the hills.

The northwest oriented hills are occupied by Charlton-Hollis fine sandy loams, indicated on the map by the symbols 17LC and 17LD. The slope ranges of these soils are 3 to 15 percent slopes and 15 to 35 percent slopes, respectively. The Charlton soils are found in uncompacted glacial till. The soils are well-drained. Charlton soils have moderate to moderately rapid permeability. The Hollis soils are formed in glacial till less than 20 inches deep over granite, gneiss, and schist bedrock. The soils are shallow and are well-drained. Hollis soils have moderate permeability. The Charlton soils are dominant soils in this mapping unit.

The Hollis-Rock outcrop complex, 17MC, 17MD, occupies the same areas where the soil is less than 20 inches thick over bedrock, with rock outcropping clearly visible. The slope ranges are the same as Charlton-Hollis, but the dominant soil is Hollis.

The gently sloping hills in the west and northwest section of the park are occupied by Paxton fine sandy loam and Woodbridge very stony fine sandy loam. The soils are indicated on the map as 35B and 31XB respectively. Both soils have formed in compacted glacial till. The slope range for the Paxton soil is 3 to 8 percent and 0 to 8 percent for the Woodbridge soil. The Paxton soil is well-drained but the Woodbridge soil is moderately well-drained and has a seasonal high water table at 18" to 24". The Paxton has moderate permeability in the surface layer and subsoil, and slow permeability in the substratum. The Woodbridge soil has moderate permeability in the surface layer and subsoil and slow to very slow permeability in the substratum.

The gently sloping hill at the base of the sloping to moderately steep hills of Charlton-Hollis is occupied by Sutton very stony fine sandy loam, indicated on the map as 41XB. The slope range of this soil is 0-8 percent. The Sutton soils formed in uncompacted glacial till. The soils are moderately well-drained and

have a seasonal high water table at 18 to 24 inches. Sutton soils have moderate or moderately rapid permeability.

The narrow depressional areas between the hills are occupied by Ridgebury, Leicester, Whitman soils and are shown on the soil map by the symbol 43M. The soils are nearly level and are poorly drained, except for Whitman which is very poorly drained. These soils are combined because they form a complex pattern on the landscape and are very similar in soil characteristics.

Broader depressional areas in the southern section of the park are occupied by Adrian-Palms mucks, shown on the soil map by soil symbol 91. Both soils formed in mucky organic deposits, 16 to 51 inches thick over mineral soil. The Adrian muck formed over sandy mineral deposits and the Palms muck formed over loamy mineral deposits. Both soils are very poorly drained. Adrian soils have rapid permeability and Palms soils have moderately slow permeability. Both soils have a high water table at or near the surface 9 to 10 months of the year.

Also mapped on site were areas of mineral soils that have been moved and replaced to build up land within the park. The most obvious example of this is the damp area where fill has been brought in as cover material. These areas are denoted on the soil map as ML2. It is not possible to make statements on the soils origin, drainage, water table, or permeability because the soil has been disturbed from its natural state.

The limitations to most uses on this site depend on the depth to bedrock, depth of seasonal high water table, and soil stability.

Nature trails throughout the area are only limited by steep slopes, rockiness, and wetness in the very poorly drained soils. Limitations for this use can be overcome by careful planning, such as routing trails around steep slopes and dangerously rocky areas. Trails directly through the wetlands may not be possible because of excessive wetness. Short spurs from a main trail could offer access to the wetland by a simple boardwalk that leads to a small observation area. The boardwalk could be removed for the winter and wet spring months.

Sanitary facilities would be difficult to establish within the interior of the park. A variety of several soil limitations such as shallow depth to bedrock, excessive wetness, slope, and slow percolation rates would prohibit the introduction of sanitary facilities with leach beds.

Active recreation, such as baseball, soccer, or tennis will have to be located in areas that are well-drained or capable of being drained. The areas will also have to be nearly level and stone-free for these types of sports. The severe limitations mentioned previously hold true for baseball, soccer, or tennis fields and courts. The landfill area would be an ideal site for sports recreational development. The major limitation to use of this land will be settlement of the landfill. Differential settling can cause depressions and washouts on an athletic field.

The soils on the site are suitable for general outdoor recreational use, such as nature trails, open class rooms, and wetlands nature study areas. Location of sanitary facilities with leach beds is severely limited in most cases.

Moderately sloping land, stoniness, rockiness, and excessive wetness will severely limit the location of active recreational areas. These limitations would

be difficult and costly to overcome. The landfill area is a likely site for sports facility development; however, it is subject to differential settling and washing out.

All clean water coming onto the site should be diverted from the landfill area. The crown of the landfill should be graded so that runoff water remains as clean as possible and does not re-enter the landfill. Collecting basins for the leachate would help in keeping the leachate out of the brook and ponds. The perimeter of the landfill should be graded and drained into these lagoons.

Drainage along one of the access roadways was a slight problem at two locations. At location one, the road had washed out from water that had its origin in the town of Waterford. Instead of installing a large culvert in this area, a depression or swale in the road lined with stone would allow the water to cross the road with very little if any damage. This system also would not dam water behind it as a culvert and headwall would, and maintenance would be simple and inexpensive.

Location two was a set of culverts that were in reasonably good condition. However, brush and sediment had reduced the capacity of these culverts. The result is slower flow and backing up of water. Culverts must be kept clean to work effectively.

CLIMATIC CONDITIONS

Bates Woods Park is located in the coastal region of the state, in the City of New London. The climate in this region is different from any other section of the state. Proximity to Long Island Sound moderates the temperature highs and lows of inland areas. Winds blowing from the Sound inland affect the coastal strip by cooling trends in spring and summer and warming effects in fall and winter. The mean annual temperature is 51°F, ranging from a 32°F average in winter to 70°F average in summer. The first frost (32°F) usually occurs by October 25, final frost (32°F) in the spring occurs by March 31. Mean annual precipitation is 49.8 inches. Snowfall averages 32.4 inches seasonally. Prevailing winds are from the northwest at 9 1/2 mph (miles per hour) from November to April. From May through October winds prevail at 7 1/2 mph from the south/southwest.

WATER RESOURCES

Water supply for the proposed project would be from the New London municipal system. There is an existing water main that runs along the paved roadway leading to the landfill. This water main would be utilized to service the proposed development.

The wetlands of Bates Woods Park form the headwaters of Fenger Brook, a stream that flows mostly through the town of Waterford. The southern and easternmost sections of the continuous wetland may overlie glacial stream deposits of sand and gravel, which would have some potential for the location of high-yield groundwater wells. About one mile south of the park, Fenger Brook flows into another wetland area that also appears to contain glacial sand and gravel deposits. The latter area has been considered for protection as a potential water-supply aquifer in a 1978 study by the Southeastern Connecticut Regional Planning Agency. It also has

been designated as a site for potential location of wells yielding small to moderate amounts of groundwater (1-100 gallons per minute) on a 1978 map entitled "Groundwater Availability in Connecticut", by Daniel Meade of the Natural Resources Center, Department of Environmental Protection.

Because the grain size and distribution of the sediments underlying the two wetlands mentioned above is not known, the actual value of the areas as water-supply aquifers is uncertain. The existence of the wetlands itself implies that fine-grained materials predominate, a condition that would restrict transmissibility and, therefore, yields. Moreover, the presence of a landfill in the headwaters of Fenger Brook may have an adverse impact on water quality, particularly in the Bates Woods wetland. It is therefore extremely unlikely that the park site will have a role to play in providing extra water to the City of New London.

WETLAND VEGETATION

The wetland of Bates Woods Park consist primarily of three types: forested swamps developed on glacial till with a variable organic layer (mineral swamp), forested swamps developed on a deep, well-decomposed muck over glacial till (organic swamp), and man-made ponds with a variable border of aquatic shrubs and herbs. The vegetation of each of these types differs and reflects the height of the water table during the vegetative season, the soil pH, and the amount of nutrients available to the plants.

Mineral swamps - Within Bates Woods Park, this wetland type is found on the Ridgebury, Leicester, Whitman Soil Complex as mapped by the Soil Conservation Service. The moisture regime* is 4-5 (moist - somewhat wet) depending on the microrelief and the water-holding capacity of the soil. The soil is often very rocky and generally has a hummocky topography. There is generally a shallow organic layer, although in some places it can approximate 20 inches. Mineral swamps have a different hydrology than the adjacent organic swamps with the major differences being a much more fluctuating water table (resulting in 1-2 feet of well-aerated soil) and a generally greater availability of nutrients due to telluric water. Although the environmental factors are significantly different from organic swamps, the differences in the vegetation are not readily apparent. The vegetation of both mineral and organic swamps is classified as a Coastal Red Maple - Skunk Cabbage Swamp (see Appendix).

Below is a list of the major plant species observed in this type of wetland in Bates Woods Park: an asterick * denotes the most abundant species.

Tree layer

*Red maple (Quercus rubra)
Sour gum (Nyssa sylvatica)
Yellow birch (Betula lutea)

Herb layer

*Touch-me-not (Impatiens capensis)
Skunk cabbage (Symplocarpus foetidus)
Jack-In-The-Pulpit (Arisaema atrorubens)
Marsh fern (Dryopteris thelypteris)

Shrub layer

*Spice bush (Lindera benzoin)
*Sweet pepperbush (Clethra alnifolia)

* Moisture regime is based on the amount of water available to plants and is evaluated on the basis of soil drainage, soil structure, and climate. See Table I.

TABLE I: SOIL MOISTURE REGIME

- 0 Extremely dry: steep eroding sands, rock piles, gravel.
- 0 Very dry: medium and coarse sands: shallow soils, not influenced by ground water.
- 1. Dry: deep silty sands and loamy sands, not influenced by ground water.
- 2. Well-drained: deep sandy loams and loams, not influenced by ground water.
- 3. Somewhat moist: loams and sandy loams with some rust mottling in the lower part of the B or C horizon. Moist variants of zonal soil types.
- 4. Moist: soil surface above the maximum water level; normal soil profile hampered because of imperfect drainage. Upper 1-2 feet of soil well-aerated during vegetative season. On mineral soils a severely mottled to homogeneous brown horizon (color B) is present. Occurs also on heavy textured soils with a perched water table and on dry deep peat.
- 5. Somewhat wet: Maximum water level at or close to the soil surface. Anaerobic soils; on mineral soils reduced, grey soil matrix with rust mottling. Gleysols, some peat soils.
- 6. Wet: water level at soil surface for most of the vegetative season. Reduced gley layer up to mineral soil surface on mineral soils; mottling usually absent or insignificant. Organic soil, gleysol.
- 7. Very wet: water level above soil surface for most part of vegetative season. Minimum water level approximately at soil surface. Organic soil.
- 8. Permanently inundated: minimum water level above soil surface, soils permanently inundated. Sapropel, dry gyttja, and marl soils.

Organic swamps - This wetland type is developed on the Adrian-Palms soil series in Bates Woods Park. Organic swamps differ from the proceeding wetlands by a moisture regime of 6 (wet) and a deep organic layer (>20 inches). Organic swamps are a common feature in Connecticut and are the most abundant wetland type. A characteristic feature of this type is a mosaic of wet depressions and raised mounds. The depressions contain standing water much of the year and contrast with the mounds which may support a number of upland herb species. Trees and shrubs are generally restricted to the mounds with mosses, liverworts, and semi-aquatic herbs occurring in the depressions. Generally the nutrient levels in these swamps are high but due to the stagnant conditions, the lack of oxygen for decomposition organisms, and the low pH, the nutrients are unavailable for plant growth.

The organic swamp in Bates Woods Park is a typical representative of the Coastal Red Maple-Skunk Cabbage Swamp and is dominated by the following species:

<u>Tree layer</u>	<u>Herb layer</u>
*Red Maple (<u>Acer rubrum</u>)	*Sensitive fern (<u>Onoclea sensibilis</u>)
	*Skunk cabbage (<u>Symplocarpus foetidus</u>)
	*Touch-me-not (<u>Impatiens capensis</u>)
<u>Shrub layer</u>	Royal fern (<u>Osmunda regalis</u>)
Winterberry (<u>Ilex verticillata</u>)	Marsh fern (<u>Dryopteris thelypteris</u>)
Sweet pepperbush (<u>Clethra alnifolia</u>)	
Swamp rose (<u>Rosa palustris</u>)	<u>Moss layer</u>
Arrow wood (<u>Viburnum recognitum</u>)	Sphagnum spp.
Spice bush (<u>Lindera benzoin</u>)	
Alder (<u>Alnus serrulata</u>)	
High bush blueberry (<u>Vaccinium corymbosum</u>)	

An abundance of vines such as catbrier (Smilax spp.) and bittersweet (Celastrus spp.) is often found on the edge of these swamps.

Ponds

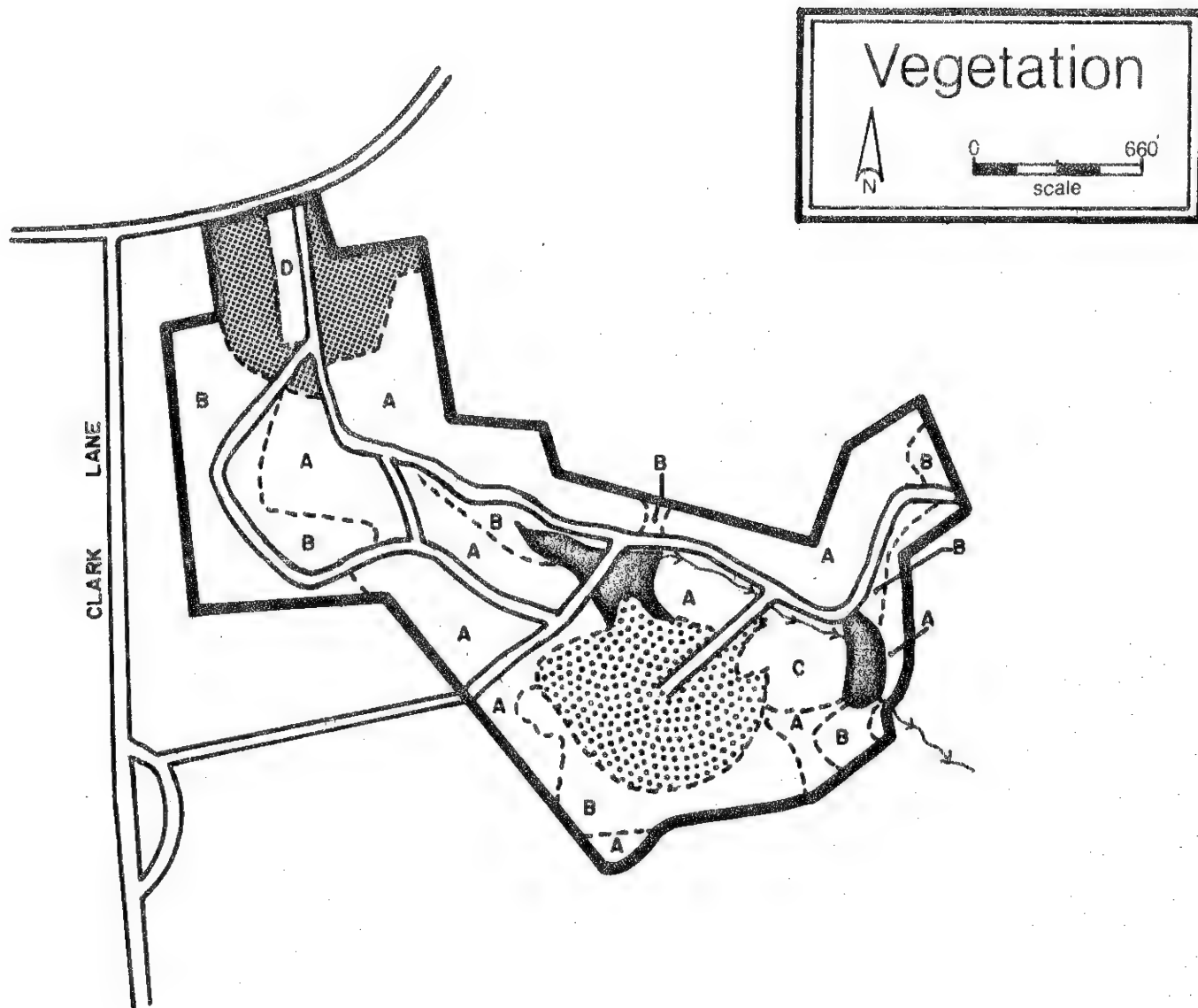
There are three ponds within the boundaries of Bates Woods Park; two created by earthen and concrete dams and one created by the landfill. All three ponds are present because of a restriction of drainage from the adjacent uplands. Only two ponds are described in this report. The third, located in the northeastern part of the park, was not visited during the survey.

The largest of the other two ponds located east of the landfill (the proposed ice skating pond), is the more interesting. This pond is moderately shallow (probably 4-8 feet) and contains an abundance of aquatic vegetation. Along the border there are well-developed sub-shrubs dominated by water-willow, grading to a red maple-oak woodland.

The predominant plant species in and surrounding the pond are:

<u>Shrub layer</u>	<u>Floating Herb layer</u>
Water willow (<u>Decadon verticillatus</u>)	Water lily (<u>Nymphaea odorata</u>)
<u>Emergent Herb layer</u>	
Bur-reed (<u>Sparganium sp.</u>)	
Wool grass (<u>Scirpus cyperinus</u>)	
Sedge (<u>Carex crinita</u>)	
(<u>Carex spp.</u>)	
Butterfly weed (<u>Asclepias tuberosa</u>)	
Joe-pye-weed (<u>Eupatorium spp.</u>)	

The other pond(s), located west of the landfill, has been created due to a blockage of normal drainage into the swamp by the landfill. At the time of the survey, this pond(s) contained a wide assortment of debris (mostly tires) and the



LEGEND

- == Road
- Property Boundary
- Vegetation type boundary stream
- Land fill, weed species, 11 acres
- Intensive recreation area, 6 acres
- Ponds, 3 acres
- Stream

VEGETATION TYPES*

- STAND A Mixed hardwoods.
- STAND B Hardwood swamp.
- STAND C Mixed hardwoods.
- STAND D Pine Plantation.

* Seedling size = trees less than 1 inch in diameter at breast height (dbh)
 Sapling size = trees 1 to 5 inches in dbh.
 Pole size = trees 5 to 11 inches in dbh.
 Sawlog size = trees 11 inches and greater in dbh.

water appeared to be stagnant. Many standing dead trees were in the water. The water from this drainage system is diverted around and/or through the landfill before it reaches the swamp.

FOREST VEGETATION

Vegetation on the uplands can be broken down into four vegetation types as shown on the Vegetation Map. Descriptions of these types follow:

Vegetation Type Descriptions

Stand A. (Mixed Hardwoods) This 39-acre two-aged fully stocked stand is predominantly made up of pole and sawlog size white oak, black oak, red oak, black birch, and red maple. Total volume ranges between 13 and 17 cords per acre on this medium quality site. Many of the largest trees are of poor quality. They have large spreading crowns with dead branches and damaged tops. These trees are potentially hazardous when near trails and recreation areas. Understory species include mountain laurel, sweet pepperbush, mapleleaf viburnum, hardwood tree seedlings, sassafras, cat greenbrier, and fox grape. Grasses, huckleberry, and clubmoss form the groundcover over parts of this site. Steep slopes and numerous large stones limit forest management potentials.

Stand B. (Hardwood swamp) Medium-quality pole to sawlog-size red maple, white ash, and yellow birch dominate this 20-acre crowded stand. A dense growth of sweet pepperbush, spice bush, high-bush blueberry, and arrowwood is present over most of this site. Cinnamon fern, sensitive fern, hayscented fern, skunk cabbage, and sphagnum moss form the ground cover in this stand. Timber management is limited by poor operability caused by the high water table and rockiness. Harvesting operations aimed at reducing the crowded condition in this stand would be limited to the driest summer months or the winter months when the ground is frozen.

Stand C. (Mixed Hardwoods) This 3-acre stand is fully-stocked with pole-size white oak, black oak, and hickory which are becoming crowded. Maple leaf viburnum and scattered patches of mountain laurel are present in the understory. Huckleberry, club moss and cat greenbrier form the ground cover in this area. A thinning, removing approximately 1/3 of the stems, focusing on trees which are directly competing with the 100 best trees per acre, would successfully reduce the crowded condition of this stand. Over time, the trees in this stand will become healthier and more stable.

Stand D. (Pine Plantation) Sawlog-size red pine make up this 2-acre fully stocked stand. These trees are somewhat crowded and would benefit from a thinning. Eventually red pine scale will probably infest these trees and cause mortality. A light thinning of perhaps 1/5 of the trees now will allow the residual trees to become stable in three to five years. At this time another thinning of 1/3 of the stems followed by a planting of ornamentals should be implemented. These actions will improve the long term stability of this area.

PROBABLE FUTURE ENVIRONMENT

Should additional recreational development not occur in Bates Woods Park, the future condition of the environment will probably remain constant. The land-

fill will continue to be used for "white goods". Current recreation facilities and badly overgrown trails will still be available for public use. Ponds and wetlands will remain clogged with vegetation and debris from the landfill.

ENVIRONMENTAL IMPACT

EFFECT ON LAND USES

The proposed development of additional recreation facilities within the park will not affect adjacent land uses. Use of a section of the park as a sanitary landfill, however, will be affected. The landfill must be closed according to State regulations before application for HCRS development funding can be made.

EFFECT ON SOCIO-ECONOMIC CONDITIONS

Further recreational facilities development within the established park will have little effect on socio-economic conditions in the city. The only possible effect on economic conditions would be additional cost to New London taxpayers for relocation and closure of the landfill existing on the site.

EFFECT ON TRAFFIC PATTERNS

The proposed project should have no appreciable effect on established traffic patterns to and within the park. Provisions for parking additional cars using the new facilities have been made in the proposed plan.

EFFECTS ON WATER RESOURCES

The present plan calls for the closing of the existing landfill. Such an action will ultimately improve local surface-water and groundwater quality, although the natural clean-up will probably be slow. Other proposed activities, with the possible exception of septic system construction and usage, would have a negligible effect on water quality. The proper design and location of a septic system in the southeastern part of Bates Woods Park may be difficult because of the shallowness of the soil and the widespread occurrence of bedrock outcrops. If the park is expected to be heavily used, consideration should be given to the extension of sewer service into the park.

EFFECTS ON VEGETATION

The proposed development of the landfill site into an open meadow for recreation and an outdoor theater will have very little effect on the vegetation in the area.

Expansion of the recreation area near the zoo will require the removal of some vegetation. The environmental impact of this development will depend on the size of the area to be cleared, whether the area is partially cleared or completely

cleared, the time of year of the clearing and how carefully the action is executed.

Erosion problems will be lessened if vegetation such as sod is re-established as soon as possible after the area is cleared.

If some trees are to be preserved for aesthetics and shade purposes in this area, they should be the healthiest trees (usually those trees with the largest crowns and no signs of damage or defects). These trees should be protected from mechanical injury and also from soil disturbances within the entire area under their crowns.

Any trees which are to be removed should be utilized for fuelwood.

Development of the three mile trail system, which will link the meadow recreation area and the zoo area together, will have limited impact on this tract's vegetation. An initial loss of some trees, under brush and ground cover vegetation will occur as areas are cleared for the trail network. Later soil compaction, mechanical root injury, direct trampling and vandalism, brought about by increased use of this area, may reduce or eliminate ground cover vegetation and accelerate the mortality of low vigor, unhealthy trees along the trails.

Loss of ground cover vegetation along the trails may reduce aesthetics and increase runoff, potentially causing accelerated erosion. Dead trees and trees with large dead branches may become hazardous to trail users.

EFFECT ON WETLAND VEGETATION

Although the total impact of the proposed construction could not be determined in such a short visit, there are a number of concerns that should be taken into consideration.

1) What and how much leachate is going from the landfill into the swamps. Leachate was observed on the eastern portion of the landfill and will have some effect on the vegetation. Although wetlands have been proven to be effective pollution sinks, their capacity is finite. Also, if the drainage is restricted downstream (see ERT report, Lieberman Property, March 1979) the wetland may become very polluted. Presently there is no indication of stress on the wetlands from the landfill.

2) Since a major drainage system is blocked by the landfill, much of the drainage has to go through or around to reach the swamp. Possibly a redirection of flow will minimize the impacts of pollution.

3) The area proposed as the skating pond presently has an interesting combination of plant species. Its present state can be useful for educational purposes, etc. Possibly, if dredging is to take place, the "natural" state of the pond should be preserved.

SOLID WASTE GENERATION

The preliminary plans call for the construction of a toilet building north of the present landfill and west of the small pond. Public sewers do not extend through the park at this time and with no immediate plans for their extension,

an alternative means for waste removal must be sought.

One alternative is the installation of a subsurface sewage disposal system to accommodate the toilet building. However, the soil mapping data of this property combined with visual observations indicate that this area would have severe limitations for the installation of a septic system. Bedrock outcroppings are quite prevalent throughout the park and especially so in the area proposed for the toilet building. Of course it may be possible to determine at a later date if some other method may be employed for waste removal. This can only be accomplished with further testing and review.

LANDFILL CLOSURE/RECLAMATION

Proper landfill closure as outlined in the regulations, is intended to minimize the environmental and health impacts of solid waste disposal areas which are no longer being utilized. Most regulations governing closure are designed to minimize infiltration of water into the solid waste which results in a concomitant reduction in leachate production.

The Bates Woods site was obviously established in a wetland which constitutes the headwater area of Fenger Brook. Ground and surface waters flowing around and through the site discharge to wetlands and a small pond south-southeast of the site. This situation is very poor from an environmental standpoint for two reasons. The refuse which was deposited below the watertable is always saturated and leachate production in this material is maximized by its constant direct contact with groundwaters. Since the site is, in fact, part of the headwater area for the Fenger Brook Drainage Basin, there is no significant dilution of leachate emanating from the site. Lack of dilution is particularly significant during low-flow periods when surface water flow is entirely derived from groundwater discharge. In the Bates Woods instance, groundwaters feeding the ponds and streams south and east of the site will have contacted solid wastes prior to contributing to surface water flow. During low-flow conditions, it is reasonable to expect that surface waters draining this site will be composed entirely of water which discharged from beneath the landfill. This situation will probably not be corrected through normal closure procedures as these do nothing to eliminate refuse contact with groundwater. Extraordinary remedial engineering would have to be undertaken to mitigate surface water impacts caused by groundwater movement through deposited solid wastes. While this type of remediation is not called for by normal closure requirements, it may be necessary if surface water use is contemplated in this area.

Site inspection indicates that several areas must be addressed in the closure plan for this site. The entire site perimeter is uncovered and in poor condition. This area shows signs of rodent activity. The site perimeter must be carefully graded, covered, and seeded. Proper baiting of the site must be carried out before final cover is applied. The site is flat and has several depressions over its surface.

This condition promotes infiltration and is not acceptable. Solid Waste Management regulations require that the final surface of the landfill be graded to a slope of at least four percent. The site is presently covered with very sandy material which is completely unacceptable for final cover. Final covering, grading, and seeding of the entire site must be accomplished in accordance with the Solid Waste Regulations.

Closure of this site will probably be quite costly and will require extensive site work. The City of New London should submit a closing plan for this site for Solid Waste's review and approval. This plan should be prepared by a professional engineer and should, at a minimum, address all measures necessary to close this site in a manner which conserves, improves, and protects the State's natural resources and environment and controls air, water, and land pollution (Section 19-524b(c) - Connecticut General Statutes). DEP will be glad to assist the City in determining the most appropriate way to accomplish proper closure of the site.

Surface water samples were collected by the State Department of Health to determine if any adverse conditions exist due to the landfill leachates. As indicated by the enclosed laboratory analyses reports (see Appendix), all heavy metals tested were found to be within acceptable limits.

Hydrocarbons were also tested for and none were detected except methane which would occur naturally in this type of water supply.

MITIGATING MEASURES SUITED TO THE PROPOSED ACTION

The loss of ground cover vegetation, underbrush, and trees through extensive soil compaction, root injury, and trampling can be kept to a minimum if trails are well-defined and clearly marked. This will limit the actual area which is intensively used.

Environmental education of the users of the trail network through workshops, guided tours, signs, and handouts should help to reduce loss of vegetation through vandalism.

The establishment of surfaced walking trails will provide multiple benefits. These trails by their very nature will be well-defined and clearly marked. Furthermore, surfacing with asphalt or a similar substance will allow use by handicapped individuals using wheelchairs. Although the cost of such surfacing is high, the benefit gained by extended use will easily justify the extra cost.

On the so-called "Rugged hiking trails" proposed in this proposal, soil compaction and the destruction of vegetation which follows can be reduced by spreading woodchips several inches deep along the trails. As woodchips rot, they lose their effectiveness and should be replaced. Crushed stone or cinders also reduce soil compaction and are more permanent than wood chips; however, they are usually more expensive.

Wise design and placement of the trail network along with proper erosion control techniques, such as well-placed water bars, should help to reduce soil loss caused by runoff.

Death of some trees caused by soil compaction and root injury, even with the addition of wood chips, crushed stone, or cinders, is unavoidable. As these trees die, they should be removed to prevent potential hazards to trail users.

Potentially hazardous dead trees, or trees with large dead branches, (specifically those in Stand A) should be removed or pruned prior to or during trail development.

Provisions for trail maintenance, trail use (hiking, ski touring, handicapped use, motorcycling, etc.), and enforcement of trail use should be established before the trails are developed further.

ADVERSE ENVIRONMENTAL IMPACT

The loss of some vegetation cannot be completely avoided. The vegetation that will be eliminated by trail development and use will not create a significant adverse environmental impact.

SHORT TERM VS. LONG TERM PRODUCTIVITY

The proposed trail development will have relatively little impact on the vegetation in this area and as a result the long-range quality and productivity of this tract will not be significantly altered.

RECREATION POTENTIAL

The City of New London proposed to develop active (ballfields, tennis courts, etc.) and passive (nature trail and nature study) recreational facilities on and near the Bates Woods landfill site. In addition, expanded use of the currently developed portion (along Chester Street) of the park, by senior citizens is proposed.

Regarding the landfill site, development for active recreational pursuits would be difficult because of site preparation work necessary beforehand. The passive (trail and nature study) component would require less preliminary site work and is therefore easier to implement because of the less stringent site requirements.

The landfill site is comprised of a variety of uncompacted refuse which will continue to offer an unstable surface for some time because of uneven settling. Establishment of "final" grades for such things as ballfields and tennis courts would therefore be questionable as a near term goal because of the potential for pockets and depressions forming. Owing to site instability, phased development of the landfill is proposed.

Among the landfill closure requirements are: 1) sealing the landfill to surface water (precipitation), and 2) establishment of a minimum slope grade of 4%. The sealing requirement precludes the planting of trees for site restoration due to the impermeable layer close to the ground surface for prevention of water infiltration. This restricts tree root system development and would enhance the possibility of tree blowdown because of weak and shallow rooting.

Prior to the establishment of any vegetation on the landfill, application of a growing medium in the form of sludge or topsoil would be necessary. An adequate

growing medium would be essential to providing a relatively wear-resistant lawn or other ground cover in a heavily used area. Short of paving the entire landfill and making an unattractively monotonous complex of basketball and tennis courts, the application of a growing medium and firm establishment of grass or alternate ground cover would be prerequisite to any use. A vegetated surface would also serve to mitigate the effect of flash run-off which pavement would certainly accentuate on a sloped area. Species of grass, ground covers, and shrubs planted should be based on the site suitability and at recommended spacings. The Agricultural Extension Service and Soil Conservation Service can assist in these recommendations.

The slope requirement may have some bearing on the type ballfields which may eventually be designated. It appears that a perfectly level (regulation type) ballfield is not possible. For this reason informal ballfields, which would not be suitable for formal competition, may be the only possibility for the site. Some relatively small level areas (for tennis courts) may be possible on the landfill area although this would have to be clarified in the closure regulations, as would possible conditions for variances from the regulations.

If not immediately usable as an active recreation area, the landfill site could possibly be used by the local schools as an earth science and biological study area. If planting over the entire landfill is not possible because the site cannot be overlain with a growing medium in a given year, an ongoing planting program could be instituted. The available data on discontinued landfill sites, as well as a comprehensive reading of that data, is limited and may be helpful in directing a course of action to future, similar proposals. The nearby schools (including colleges if analysis equipment is unavailable in the public schools) could analyze water samples, growth data, and study the patterns of animal habitation. Data collected would provide much information for classroom study. A non-landfill control area would be desirable, though not essential, to comparing results with similar planting programs. A possible control area might be the nearby former Stenger Farm now owned by the Town of Waterford and located on the west side of Clark Lane. Planting of similar plots of shrubs and grasses can provide a separate data base.

The data collected would be useful in determining the evolution of a landfill site under specifically identified conditions. Students could gain at least a cursory knowledge of some of the chemical, biological and other natural and man-related forces at work in shaping the environment. In addition to the knowledge gained, a greater appreciation of the complexities of natural systems may also accrue. Recreational benefits would eventually be derived as the site becomes more stable enabling a greater diversity and a heavier volume of activity.

A meadow-type field on the landfill site would be suitable for kite and model airplane flying, frisbee tosses, informal ball games, learning how to ski, bird-watching and nature studies (open classroom concept).

The pond southeast of the landfill is thought to be receiving considerable leachate from waters feeding the pond from the landfill. This appears to be a long term, not readily alterable situation thereby limiting pond usability. In its current state it may be usable for: ice skating, and for providing scenic relief (particularly with the water lillies and flowering shrubs and trees around its perimeter).

Low density use is advocated for the relatively sensitive wetland and ledge outcrop portions of Bates Woods. Foot trail use is compatible with management of this area. The non-wetland portions of this area between the zoo and the landfill have thin soils. Reinforcement plantings of conifers, such as white pine and hemlock which drop needles, would enhance the foot traffic tolerance and erosion resistance of the paths. Shallow soils would dictate careful planting of tree seedlings to ensure survival. A forester should be consulted for recommendations and a determination of site suitability before any sizable planting program is undertaken.

The concrete picnic tables remaining from W.P.A. days, though of massive construction, should probably be removed if they are not repairable. In their present state, they are rather unsightly and of limited use. A small picnic grove with about six to eight tables may be possible in the wooded area located between the landfill site and the pond to its southeast.

A screen planting of conifers on the roadside (Chester Street) perimeter of the picnic area and zoo would provide a measure of privacy via such a sight and sound buffer strip. Vandalism potential may preclude establishing such a screen planting however.

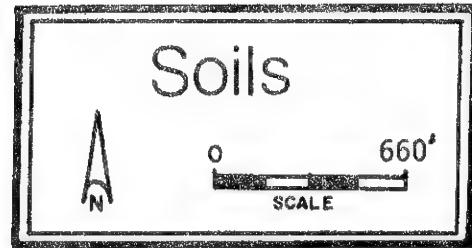
If sufficient usable area is available, establishment of the proposed senior citizen area in proximity to the zoo and picnic area should pose no problem. Use of this part of Bates Woods is already rather intense. Since this represents an increase in activity in this intensively used part of the park, it may be helpful to landscape this area in the interest of integrating these diverse activities. Strategic placement of shrubs can create a feeling of greater privacy and more clearly establish zones of use while helping to beautify the site.

Some of the site limitations and potential problems in implementing the proposed plan are:

- 1) Large areas of wetland and exposed bedrock.
- 2) Poor water quality because of flash run-off from surrounding development and landfill leachate.
- 3) Uncompacted landfill with settling problems and vermin.
- 4) Possibility of odors emanating from landfill.
- 5) Possible indiscriminate horseback and motorcycle use of the trails.
- 6) Expense and time involved in modifying the landfill area to make it suitable for active recreational pursuit facilities.

The trail related proposals for summer or winter use appears feasible for implementation now, as does the proposal for expanded use of the Chester Street side for senior citizen activities. The upgrading of existing trails and roads along with a planting program could be done now to enhance site operability and aesthetic quality.

Appendix



This is an enlargement from the original 1,320'/inch scale to 660'/inch.

Information taken from: Interim Soil Survey Report, New London County, Connecticut, 1978; soil survey sheet #430; prepared by the United States Department of Agriculture, Soil Conservation Service. Advance copy, subject to change.

BATES WOODS PARK
NEW LONDON, CONNECTICUT

PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Soil Symbol	Approx. Acres	Percent of Acres	Principal Limiting Factor	Urban Use Limitations*			
					On-Site Sewage	Buildings with Basements	Streets & Parking	Land-Scaping
Charlton-Hollis	17LC	23	27	Slope, Large stones	2	2	2	2
Charlton Part Hollis Part					3	3	3	3
Charlton-Hollis	17LD	10	12	Slope, Large stones	3	3	3	3
Hollis	17MC	2	2	Depth to Rock	3	3	3	3
Hollis	17MD	1	1	Slope, Depth to Rock	3	3	3	3
Paxton	35B	6	7	Frost Action Percs Slowly	3	1	2	1
*Ridgebury, Leicester, Whitman	43M	13	15	Wetness, Large Stones, Frost Action	3	3	3	3
Sutton	41XB	6	7	Wetness, Frost Action, Stones	3	3	2	2
Woodbridge	31XB	6	7	Frost Action, Large Stones	3	3	3	2
*Adrian-Palms	91	6	7	Excess Humus, Floods, Low Strength	3	3	3	3
Udorthents	ML2	9	11					
Water	W	3	4					
		85	100%					
					Limitations Determined On Site			

Limitations: 1 = slight, 2 = moderate, 3 = severe.

* Denotes Regulated Wetland Soil Under Public Act 155.

BATES WOODS PARK
NEW LONDON, CONNECTICUT

PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Soil Symbol	Approx. Acres	Percent of Acres	Principal Limiting Factor	Recreational Use Limitations*				
					Camp Areas	Picnic Areas	Play-grounds	Paths & Trails	
Charlton-Hollis	17LC	23	27	Slope, Large Stones	2	2	3	2	
Charlton Part Hollis Part					2	2	3	2	
Charlton-Hollis	17LD	10	12	Slope, Large Stones	3	3	3	2	
Hollis	17MC	2	2	Slope, Large Stones	2	2	3	2	
Hollis	17MD	1	1	Slope, Depth To Bedrock	3	3	3	2	
Paxton	35B	6	7	Percs Slowly	2	1	2	1	
*Ridgebury, Leicester, Whitman	43M	13	15	Wetness, Large Stones	3	3	3	3	
Sutton	41XB	6	7	Large Stones	2	1	2	2	
Woodbridge	31XB	6	7	Percs Slowly, Large Stones	2	1	2	2	
*Adrian-Palms	91	6	7	Wetness, Floods, Excess Humid	3	3	3	3	
Udorthents	ML2	9	11						Limitations Determined On Site
Water	W	3	4						
		85	100%						

Limitations: 1 = slight, 2 = moderate, 3 = severe.

* Denotes Regulated Wetland Soil Under Public Act 155.

SOIL INTERPRETATIONS FOR URBAN USES

The ratings of the soils for elements of community and recreational development uses consist of three degrees of "limitations:" slight or no limitations; moderate limitations; and severe limitations. In the interpretive scheme various physical properties are weighed before judging their relative severity of limitations.

The user is cautioned that the suitability ratings, degree of limitations and other interpretations are based on the typical soil in each mapping unit. At any given point the actual conditions may differ from the information presented here because of the inclusion of other soils which were impractical to map separately at the scale of mapping used. On-site investigations are suggested where the proposed soil use involves heavy loads, deep excavations, or high cost. Limitations, even though severe, do not always preclude the use of land for development. If economics permit greater expenditures for land development and the intended land use is consistent with the objectives of local or regional development, many soils and sites with difficult problems can be used.

Slight Limitations

Areas rated as slight have relatively few limitations in terms of soil suitability for a particular use. The degree of suitability is such that a minimum of time or cost would be needed to overcome relatively minor soil limitations.

Moderate Limitations

In areas rated moderate, it is relatively more difficult and more costly to correct the natural limitations of the soil for certain uses than for soils rated as having slight limitations.

Severe Limitations

Areas designated as having severe limitations would require more extensive and more costly measures than soils rated with moderate limitations in order to overcome natural soil limitations. The soil may have more than one limiting characteristic causing it to be rated severe.

SURFACE WATERS COLLECTION AND EXAMINATION REPORT

OL-107A REV. 11-78

CONNECTICUT DEPARTMENT OF HEALTH SERVICES
LABORATORY DIVISION
P. O. Box 1689, Hartford, Conn. 06101
10 Clinton Street Telephone 566-5626

Appendix B

COLLECTED BY <i>FRANK HOMISKI</i>	COLLECTORS NO. <i>1FH</i>	DATE COLLECTED <i>8/30/79</i>	TIME COLLECTED <i>10:30 AM</i>
--------------------------------------	------------------------------	----------------------------------	-----------------------------------

SOURCE <i>Lower Pond - Bates Woods Park</i>
--

LOCATION <i>New London</i>	SAMPLE OF <i>Pond Water</i>
-------------------------------	--------------------------------

REPORT TO <i>S.E.R.C. 701 W. THAMES ST. NORWICH</i>
--

ADDITIONAL INFORMATION

BACT & HYDROCARBONS

Color		
Turbidity		
Total Solids		mg/l
Fixed		mg/l
Volatile		mg/l
Suspended Solids		mg/l
Hydrogen-ion Concentration		pH
Chlorides as Cl		mg/l
Alkalinity as CaCO ₃		mg/l
NITROGEN CONSTITUENTS AS NITROGEN (N)	Nitrite	mg/l
	Nitrate	mg/l
	Ammonia	mg/l
	Organic	mg/l
Iron as Fe		mg/l
Dissolved Oxygen		mg/l
Biochemical Oxygen Demand		mg/l
Detergent - as ABS		mg/l
Coliform Organisms	MPN	100 m
Coliform Organisms	Fecal MPN	100 m
Coliform Organisms	MF	1700 100 m
		mg/l
		mg/l

CONCLUSIONS

Based upon the assumption that the sample was collected and shipped exactly as directed and that the data supplied are correct.

BATHING WATERS ONLY

- ☐ The results of the analysis of this sample are satisfactory for a sample from a bathing area.
- ☐ The concentration of coliform organisms is moderately high for a sample from a bathing area. If the results of a sanitary survey of the surrounding watershed indicate the presence of potentially harmful sources of contamination then the area should be considered unsafe for bathing.
- ☐ The concentration of coliform organisms is in excess of that which is considered acceptable for bathing.
- ☐ Although safe for bathing certain of the chemical constituents are high.

ALL OTHER SURFACE WATERS

Coliform is moderately high.
Hydrocarbons See attached sheet.
9/10/79

John J. Redys

P.O. Box 1689, Hartford, Conn. 06101

LABORATORY NUMBER: 28076

HYDROCARBONS: Vapor Test

Temp. 100 °C Column

Temp. °C Column

Results expressed as Micrograms per Liter: none detected except methane

Component	Concentration	Component	Concentration
✓ Methane	320	METHYL ACETATE	
Butane		METHYL ALCOHOL	
Propane		METHYL CELLOSOLVE	
ACETONE		METHYL iso-BUTYL KETONE	
AMYL ACETATE		METHYL ETHYL KETONE	
AMYL ALCOHOL		METHYL METHACRYLATE	
iso-AMYL ALCOHOL		METHYLENE CHLORIDE	
BENZENE		NONANE	
BUTYL ACETATE		iso-OCTANE	
BUTYL ALCOHOL		PENTANE	
iso-BUTYL ACETATE		PETROLEUM ETHER	
iso-BUTYL ALCOHOL		PROPYL ACETATE	
n-BUTYL ALCOHOL		PROPYL ALCOHOL	
CARBON TETRACHLORIDE		iso-PROPYL ACETATE	
CHLOROBENZENE		iso-PROPYL ALCOHOL	
CHLOROBUTANE		iso-PROPYL ETHER	
CHLOROFORM		1,1,2,2,-TETRACHLOROETHANE	
DICHLOROBENZENE		TETRACHLOROETHYLENE	
1,2-DICHLOROPROPANE		TOLUENE	
ETHYL ACETATE		1,1,1-TRICHLOROETHANE	
ETHYL ALCOHOL		1,1,2-TRICHLOROETHANE	
ETHYL BENZENE		TRICHLOROETHYLENE	
ETHYL ETHER		VINYL ACETATE	
ETHYLENE CHLORIDE		XYLENE (META)	
HEXANE		XYLENE (ORTHO)	
		XYLENE (PARA)	

SURFACE WATERS COLLECTION AND EXAMINATION REPORT

OL-107A REV. 11-78

CONNECTICUT DEPARTMENT OF HEALTH SERVICES

LABORATORY DIVISION

P. O. Box 1689, Hartford, Conn. 06101

10 Clinton Street

Telephone 566-5626

28226 of blot

LAB NO. 28226		TOWN 95	
DATE RECEIVED: 9-19-74		DATE REPORTED: 9-19-74	
RESULTS OF EXAMINATION			
Gross Appearance			
Color			
Turbidity			
Total Solids		mg/l	
Fixed		mg/l	
Volatile		mg/l	
Suspended Solids		mg/l	
Hydrogen-ion Concentration		pH	
Chlorides as Cl		mg/l	
Alkalinity as CaCO ₃		mg/l	
NITROGEN CONSTITUENTS AS NITROGEN (N)	Nitrite	mg/l	
	Nitrate	mg/l	
	Ammonia	mg/l	
	Organic	mg/l	
Iron as Fe		mg/l	
Dissolved Oxygen		mg/l	
Biochemical Oxygen Demand		mg/l	
Detergent as ABS		mg/l	
Coliform Organisms	MPN	100 ml	
Coliform Organisms	Fecal MPN	100 ml	
Coliform Organisms	MF	100 ml	
manganese		0.002 mg/l	
chromium		0.000 mg/l	
copper		0.00	
lead as pb		0.03	
nickel as ni		0.02	
zinc as zn		0.00	

COLLECTED BY: FRANK HONISKI	COLLECTORS NO.: 2FH	DATE COLLECTED: 9/3/74	TIME COLLECTED: 12:00 PM
SOURCE: STRATH FERRIS LOWER POND BATES Woods			
LOCATION: New London	SAMPLE OF: Fresh Water		
REPORT TO: SERO 401 W. THAMES ST NORWICH			

ADDITIONAL INFORMATION

Heavy metals - Zinc, Copper, Lead etc.

CONCLUSIONS

Based upon the assumption that the sample was collected and shipped exactly as directed and that the data supplied are correct.

BATHING WATERS ONLY

- ☐ The results of the analysis of this sample are satisfactory for a sample from a bathing area.
- ☐ The concentration of coliform organisms is moderately high for a sample from a bathing area. If the results of a sanitary survey of the surrounding watershed indicate the presence of potentially harmful sources of contamination then the area should be considered unsafe for bathing.
- ☐ The concentration of coliform organisms is in excess of that which is considered acceptable for bathing.
- ☐ Although safe for bathing certain of the chemical constituents are high.

ALL OTHER SURFACE WATERS

ELIZABETH J. HOWARD

9/14/74

RECEIVED TO CONTROL

John J. Redys
DIRECTOR

Descriptions of Typical Coastal Plant Communities

Note: In the following descriptions, the numbers appearing next to a plant name indicates its abundance as follows:

- r, rare
- 1-, 1-2%
- 1+, 2-5%
- 2-, 5-12%
- 2+, 13-25%
- 3, 25-50%
- 4, 50-75%
- 5, 75-100%

Numbers appearing next to community names refer to the following source materials:

1. Damman, A.W.H. 1977. Floristic Composition and Topographic Distribution of the Forest Communities of the Gneiss Areas of Western Connecticut. *Naturaliste Can.* 104:23-45.
2. Egler, F.E. and Niering, W.A. 1965. The Vegetation of Connecticut Natural Areas. No. 1. Yale Natural Preserve, New Haven. *Conn. Geol. Nat. Hist. Surv.*
3. Niering, W.A. and Egler, F.E. 1966. The Vegetation of Connecticut Natural Areas. No. 2. The Natural Area of the Audubon Center of Greenwich. *Conn. Geol. Nat. Hist. Surv.*

Coastal Oak-Huckleberry Community (1, 2, 3)

Trees:

- | | |
|-----------------|-----------------------|
| *Scarlet Oak, 3 | Red Maple, 1+ |
| *Black Oak, 2+ | Shadbush, 1- |
| *White Oak, 2+ | Pignut Hickory, 1+ |
| Red Oak, 1+ | Mockernut Hickory, 2- |
| Chestnut Oak, r | Shagbark Hickory, 1- |

Shrubs:

- | | |
|---------------------------|-----------------------|
| *Huckleberry, 3 | White Oak (shrub), 1+ |
| Mountain Laurel, 2- | Red Maple (shrub), 1+ |
| Maple leaved Viburnum, 1+ | |

Herbs:

- | | |
|------------------------|----------------------|
| Hairgrass, 2- | Aster, 1- |
| Lowbush Blueberry, 2+ | Canada Mayflower, 1+ |
| Pennsylvania sedge, 1+ | |

Coastal Oak-Viburnum Community (2, 3)

Trees:

*White Oak, 2+
*Scarlet Oak, 2+
*Black Oak, 2+
Red Oak, 2-
*Black Birch, 2+

Mockernut Hickory, 2-
Beech, 2-
Red Maple, 1+
Sassafras, 1+
Dogwood, 1+

Shrubs:

*Maple leaved Viburnum, 3
Mountain Laurel, 2-
Northern Arrowwood, 1+

Huckleberry, 1+
Hazelnut, 1+

Vines:

Catbrier, 2-
Virginia Creeper, 1+

Poison Ivy, 1-

Herbs:

Sarsaparilla, 2-
Aster, 1+
Canada Mayflower, 1+
Pennsylvania sedge, 1+
Lowbush Blueberry, 1+

Dewberry, 1+
Bellwort, 1-
Whorled Loosestrife - 1-
Hay-scented Fern, 1-
Solomon's Seal, 1+

Coastal Red Maple - Skunk Cabbage Swamp

Trees:

*Red Maple, 4
Sourgum, 2-
Swamp Oak, 2-

Yellow Birch, 1+
American Ash, 1+
American Elm, 1-

Shrubs:

*Sweet Pepperbush, 3
*Spicebush, 3
Winterberry, 2-
Alder, 2-
Elderberry, 1+

High Bush Blueberry, 1+
Northern Arrowwood, 1+
Swamp Rhododendron, 1+
Red Maple (shrub), 1-

Herbs:

*Skunk Cabbage, 2+
*Cinnamon Fern, 2+
Touch-me-Not, 2+

Marsh Fern, 1+
Royal Fern, 1+
Sensitive Fern, 1-

* dominant species

Department of Environmental Protection

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The following regulations are effective January 4, 1978

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Solid Waste Management

Sec. 19-524.1 Title

This section shall be known, and may be cited as "Solid Waste Management Regulations."

Sec. 19-524.2. Definitions

(a) The definitions of terms used in these regulations shall be consistent with the definitions in Section 19-524a of the General Statutes.

(b) The following terms not defined in Section 19-524a are defined as follows.

(1) Natural Resource Systems means the total system produced by the interaction or interdependence of the earth materials, the atmospheric system and the biologic system for any designated geographic area. These systems include but are not limited to the characteristics and behavior of soil, unconsolidated geologic material, bed-rock, surface water, subsurface water, air, climate, and the biota.

(2) Ground water means water present in the zone of saturation of an aquifer.

(3) Water table means that surface of a body of unconfined ground water at which the pressure is equal to that of the atmosphere.

(4) Maximum high water table means the highest elevation reached by the upper level of the ground water as determined by prudent engineering evaluation and in accordance with test methods acceptable to the Commissioner.

(5) Cover material means soil or other suitable material used to cover compacted solid waste in a solid waste disposal area. This material shall be classified as GM, silty gravels, poorly graded gravel-sand-silt mixtures; GC, clayey gravels, poorly graded gravel-sand-clay mixtures; SM, silty sands, poorly graded sand-silt mixtures; SC, clayey sands, poorly graded sand-clay mixtures; ML, inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity in accordance with the unified soil classification system.

(6) Working face means that portion of the disposal area where the waste is deposited, spread and compacted prior to the placement of cover material.

(7) Vector means an insect or rodent or other animal (not human) which can transmit infectious diseases from one person or animal to another person or animal.

(8) Operator means an individual who is responsible for maintaining the solid waste disposal area in conformance with regulations and permit.

(9) Surface water means the tidal waters, harbors, estuaries, rivers, brooks, watercourses, waterways, lakes, ponds, springs, marshes, drainage systems and all other surfaces, bodies or accumulations of water, natural or artificial, public, or private which are contained within, flow through or border upon this State or any portion thereof.

(10) Transfer station means a solid waste facility that is a central collection point for the solid waste generated within a municipality or group of municipalities where solid wastes received are transferred to a vehicle for removal to another solid waste facility.

(11) Leachate means that liquid which results from ground or surface water which has been in contact with solid waste and has extracted material, either dissolved or suspended, from the solid waste.

(12) Hazardous wastes mean solid and liquid wastes in the following classifications:

- (a) explosives
- (b) pathogenic wastes
- (c) radioactive wastes
- (d) chemical wastes which either create an immediate safety hazard to persons disposing of the waste or which by virtue of their chemistry and/or the method of disposal present a threat, as determined by the Commissioner, to the quality of ground or surface waters.

(e) hospital operating room wastes.

(13) Bulky waste means landclearing, demolition or other non-putrescible wastes. The term bulky waste includes, but is not necessarily limited to, the following: tires, rubble and stumps, and white goods.

(14) Person means any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, agency, political subdivision of this State, any other state, the United States, or political subdivision or agency thereof or any legal successor, representative, agency or any agency of the foregoing.

(15) Clean fill means natural soil which is inert in terms of leaching and does not pose a pollution threat to ground or surface waters.

(16) Cell construction method means the spreading, compacting and covering daily of solid wastes in areas which are enclosed by at least three (3) walls or berms of soil.

Sec. 19-524.3. Public availability of information

(a) Any records, reports or other information obtained by the Commissioner or any file with the Department shall, pursuant to the provisions of Section 1-7 through 1-20 of the Connecticut General Statutes, as amended, be made available to the public. Upon a showing, satisfactory to the Commissioner, by any person that such records, reports or other information, or particular parts thereof, if made public, would divulge methods or processes entitled to protection as trade secrets of such person, the Commissioner shall consider such record, report or information, or particular part thereof, confidential, except that such record, report or information may be disclosed to other officers, employees, or authorized representatives of the State concerned with carrying out these regulations or when relevant in any hearing conducted by the Department of Environmental Protection or in any judicial proceeding, subject to such safeguards as the hearing officer or presiding judge may impose.

(b) The Commissioner, when he deems it appropriate, may require any person requesting information under this section to pay the cost of reproducing such information.

Sec. 19-524.4. Permits for solid waste facilities

(a) Permits under this regulation shall not be required for the following facilities:

(1) Solid waste facilities at which less than five (5) tons per year of solid waste are processed or disposed of, provided that hazardous or toxic wastes are not disposed of at the area.

(2) Areas for the disposal of clean fill which do not pollute ground and surface waters of the State of Connecticut.

(b) Application for permits. (1) Any person, municipal authority or regional authority that builds, establishes or alters a solid waste facility after July 1, 1971, must obtain a permit pursuant to Sections 19-524(b) and 25-54(i), Connecticut General Statutes unless excluded by Section 19-524-4(a) of these regulations.

(2) Application for each solid waste facility permit shall be made by the owner or operator of the facility on forms furnished by the Commissioner. Each application shall include all information required by the most current regulations or guidelines published by the Department

regarding such facility: however, nothing in these regulations shall prevent the Commissioner from requesting additional information concerning an application if he determines that such additional information is necessary.

(3) For purposes of permit application, the Commissioner shall classify solid waste disposal areas. Such classification may include, but need not be limited to the following scheme:

(a) Existing solid waste disposal areas where future disposal will take place only in areas where solid waste had previously been disposed of.

(b) Existing solid waste disposal areas where future disposal will take place in areas where no solid waste had previously been disposed of.

(c) New solid waste disposal areas to be permitted after satisfactory review and approval of an application.

Information required by the Commissioner shall depend upon the class of the solid waste disposal areas. Such information shall be outlined in Guidelines prepared by the Department.

(4) An application will not be deemed to have been received by the Department until all papers and documents required in support of the application have been submitted in proper form. The Department shall determine within ten (10) working days of receipt of a prepared application whether it is complete and shall so notify the applicant.

(5) The Commissioner shall inform an applicant of the decision on the application within sixty (60) days of the receipt of the application. The Commissioner may, on notice to the applicant, extend the time for acting on the application an additional sixty (60) days.

(6) The Commissioner may impose any reasonable conditions upon an approval of a solid waste facility.

(c) **Transferability.** The holder of a permit may not transfer it without prior written permission of the Commissioner.

(d) **Denial or revocation of a permit.** (1) A permit may be denied if the Commissioner determines that:

(a) the engineering information and operation and management plan submitted by the applicant indicates that the solid waste facility will not be operated in compliance with applicable statutes or regulations; or

(b) the facility is not consistent with the municipal or regional authority's 20 year solid waste management plan adopted pursuant to Section 19-524e, Connecticut General Statutes.

(2) **Revocation of a permit.** A permit may be revoked or modified for failure to comply with the terms of the permit or violation of any applicable regulation or statute.

(3) If additional data becomes available which indicates that the operation and management, and engineering of the facility as outlined in the original permit and application is insufficient to maintain the facility in compliance with applicable regulations or statutes, the Commissioner may modify the permit of such facility to assure compliance with regulations and statutes. Any permittee who had knowledge of such data or information must inform the Commissioner in writing of such data or information within thirty (30) days.

(4) Notice of denial, revocation or modification of a permit shall set forth the reasons for the action taken and shall be effective as stated therein and shall be considered an order of the Commissioner for purposes of administrative appeal under Section 19-524-11 of these regulations.

(5) **Public information and hearing procedures.** (a) In all cases where there is a requirement of legal notice, the Commissioner shall cause the applicant to publish at his own expense all notices of hearings and notices required by law.

(b) The Commissioner shall inform the public of all decisions approving, denying, or conditionally approving any permit.

(6) **Signature.** No permit issued under this section shall be effective until both the applicant or his duly authorized representative and the Commissioner shall have signed the permit which signatures shall constitute an agreement to abide by the terms and conditions therein.

Sec. 19-524-5. Certification

(a) **Certified operator present.** An operator certified by the Commissioner or a designee of the certified operator must be present at the solid waste facility at all times during operating hours, except as provided by Section 19-524-5 (c) of these regulations.

(b) **Certification procedure:** (1) Persons desiring to be certified shall make application with the Commissioner on forms provided by the Commissioner.

(2) Before an applicant is certified, he shall demonstrate to the Commissioner that he has had sufficient training in solid waste facility operational procedures so that he will be able to oversee the operation of the solid waste facility in accordance with applicable State and Federal laws and regulations. Such training may consist of on-the-job or classroom instruction or a combination of both in solid waste management procedures and public health and safety.

(3) The Department of Environmental Protection shall administer to applicants for certification an examination designed to test the knowledge of the applicant regarding operational procedures of a solid waste facility relative to public health, safety and environmental matters. Such examination may be written, oral or performance oriented.

(4) Upon satisfactory fulfillment of the requirements of these regulations by an applicant, the Commissioner shall issue a certificate designating his competency and knowledge of solid waste facilities and their operation. Certificates shall be valid for a period of two (2) years from date of issuance. Certificates are revocable, following opportunity for hearing, for non-compliance with State laws and regulations when such non-compliance is the result of the operator's action or inaction. Revocation of an operator's certification shall be considered an order of the Commissioner for purposes of administrative appeal under Section 19-524-11 of these regulations.

(5) To renew an operator certificate that has expired, the operator must have completed an on-going training course that is offered by the Department of Environmental Protection for maintenance of proficiency and renewal of certificate.

(c) **Loss of certified operator.** In the event a solid waste facility's operator has his certification revoked, it lapses or the operator leaves for any reason, the facility shall be considered in compliance with State law and regulations regarding solid waste facility operator certification provided that the Department has in writing an agreement with the owner of operator or permittee of the facility to send its current operator to the next State-run course and to have the operator take the next State Certification examination when it is administered.

Sec. 19-524-6. Management of solid waste disposal areas

The following standards shall apply to all solid waste disposal areas.

(a) **Protection of ground and surface waters.** (1) Minimum separation from ground waters. A minimum of sixty (60) inches shall be maintained between the base of deposited solid wastes and the maximum high water table or bedrock unless the permittee can establish to the satisfaction of the Commissioner that some lesser separation will be adequate to insure against contact of solid wastes with ground water. This provision shall not apply to solid

waste disposal areas subject to existing State solid waste permits which expressly authorize a minimum separation from ground waters or bedrock of less than sixty (60) inches, provided that the permittee establishes to the satisfaction of the Commissioner that the continuation of solid waste disposal in accordance with such existing permit will not result in contact of solid waste with ground water.

(2) The solid waste disposal area shall be graded and/or provided with drainage facilities to minimize infiltration or rainfall or surface runoff onto the area, to prevent erosion or washing of the area, and to prevent the collection of standing water on the area. The final surface of the area shall be graded to a slope of at least four (4) per cent unless otherwise authorized by the commissioner, and the side slopes shall not exceed a grade of one (1) on three (3), one vertical on three horizontal, unless otherwise authorized by the commissioner.

(3) Flood plains. The deposited solid waste shall be adequately protected from washout and displacement by 50-year flood waters.

(4) Surface water. Solid waste shall not be deposited so as to come in contact with surface watercourses. Disposal operations shall be conducted so as to minimize impact on watercourses. The commissioner shall determine as required by site conditions if a minimum separation distance should be maintained.

(5) Erosion control. Siltation or retention basins or other approved methods of retarding runoff should be used where necessary to avoid stream siltation or flooding problems due to excess runoff.

(6) Wells. A minimum of one thousand (1000) feet shall be maintained between deposited solid wastes and wells used for water supply purposes unless the owner or operator can establish to the satisfaction of the commissioner that some lesser separation will be adequate to insure against pollution of the waters withdrawn by or from said wells. Nothing in these regulations shall prevent the commissioner from requiring a greater separation distance when physical conditions necessitate such action to insure against pollution of the waters withdrawn from said wells.

(b) **Access to area:** (1) Access roads. All-weather roads which provide access between public roads or highways and the solid waste disposal area shall be maintained so as to be passable by all vehicles which utilize the area.

(2) Access to the disposal area shall be controlled to prevent unauthorized use. Control may be accomplished through use of appropriate fences, gates and signs.

(c) **Fire protection.** Appropriate measures shall be taken to prevent and control fires.

(d) **Measuring procedures.** Daily records for regional facilities. Daily records shall be maintained in a manner acceptable by the commissioner. Such record shall be available for inspection by representatives of the department at any time. Monthly summaries of these records shall be submitted to the department no later than ten (10) days after the last day of each quarter.

(e) **Certified operators.** (1) An operator, certified by the Commissioner in accordance with Section 19-524b(b), Connecticut General Statutes, or a designee of the certified operator shall be present at a solid waste disposal area at all times during working hours to ensure that operations are conducted in conformance with applicable statutes and regulations.

(2) Unloading of solid wastes shall be restricted and controlled by the operator so as to facilitate the proper handling of solid wastes. Salvage at the working face shall be prohibited.

(3) The operator shall maintain a daily log, as prescribed by the Commissioner to record operational information.

(f) **Working face.** (1) Size of working face. The working face of a solid waste disposal area shall be so confined as to be easily maintained with the available equipment.

(2) The cell construction method of sanitary landfilling shall be used. Solid waste shall be spread in layers not to exceed three feet thick while confining it to the smallest practicable area in order to conserve capacity of the solid waste disposal area, minimize moisture infiltration and settlement and public health problems. Each individual cell shall not exceed ten (10) feet in height unless the owner or operator of such solid waste disposal area can establish to the satisfaction of the commissioner that individual cells with a height greater than ten (10) feet may be utilized without interfering with the safe and sanitary operation of said disposal area. Cover material shall be used on each cell according to Section 19-524-6 (i).

(g) **Equipment.** (1) The equipment used for spreading, compacting and covering shall be of sufficient size and number to achieve maximum compaction and efficient operation as recommended by the Commissioner in the current guidelines.

(2) Equipment maintenance facilities. Provision shall be made for the routine operational maintenance of equipment at the solid waste disposal area or elsewhere, and for the prompt repair or replacement of equipment.

(3) Alternative equipment. The owner or operator of a solid waste disposal area shall establish a contingency plan outlining procedures for obtaining alternative equipment or other alternative method of disposal in the event of equipment breakdown.

(h) **Blowing litter.** Blowing litter shall be controlled by providing fencing near the working area or by the use of earth banks or natural barriers acceptable to the Commissioner. Solid wastes shall be unloaded in such a manner as to minimize scattering. The entire solid waste disposal area shall be cleared of litter at the end of each working day.

(i) **Cover operations.** (1) Cover material. Cover material shall be applied and compacted to a minimum thickness of six (6) inches on all exposed wastes by the end of each working day.

(2) Intermediate cover. On all but the final lift of a solid waste disposal area, if more than nine months is expected to elapse before another lift is added, a layer of suitable intermediate cover material, compacted to a minimum uniform depth of one (1) foot, shall be placed on such area and suitable vegetative cover shall be planted and maintained thereon.

(3) Final cover. A uniform layer of suitable final cover material compacted to a minimum depth of two (2) feet shall be placed over the entire surface of each portion of the final lift not later than one week following the final placement of solid waste in that portion of the area. Upon application of final cover, the area shall be regraded to prevent erosion and ponding, and suitable vegetative cover shall be planted and maintained thereon.

(j) **Vector control.** (1) Conditions shall be maintained that are unfavorable for the harboring, feeding and breeding of vectors.

(2) Additional means for controlling and exterminating vectors shall be instituted, whenever necessary in the judgment of the Commissioner, to prevent the transmission of disease.

(k) **Decomposition gases.** Decomposition gases generated within the solid waste disposal area shall be controlled, as necessary, to avoid posing hazard to any persons and property and to minimize adverse environmental effects.

(l) **Exclusion.** (1) Hazardous wastes and/or Industrial wastes which are toxic, hazardous to handle or may cause contamination of ground or surface waters shall be excluded from the solid waste disposal area or dis-

posed of under the direction of the Department of Environmental Protection and with written approval from the Commissioner.

(2) Liquid wastes shall be excluded from the solid waste disposal area or disposed of under the direction of the Department of Environmental Protection and with the written approval from the Commissioner.

(m) **Resource recovery.** Materials to be recycled shall be maintained in a separate area so as not to interfere with disposal operations. Materials held for reuse or resale shall be adequately screened or removed at frequent intervals.

(n) Within ninety (90) days of completion of construction, the department shall be furnished with a complete set of as-built drawings of the facility.

Sec. 19-524-7. Operation and management of solid waste transfer stations

(a) An applicant wishing to establish a solid waste transfer station must obtain approval of the plans and specifications from the Department by issuance of a permit.

(b) An application for a transfer station shall include, but need not be limited to the following:

(1) An application form as prescribed by the Commissioner.

(2) A site plan, complete construction plans and specifications of the facility and all appurtenances, and an operation and management plan developed in accordance with applicable guidelines.

(3) A copy of any haul-away contract made by a city, town, borough or regional authority for collection, transportation, processing, storage and disposal outside its boundaries of solid wastes generated within its boundaries in accordance with Section 19-524g, Connecticut General Statutes.

(c) The plans for a transfer station which will operate for a period greater than two (2) years, submitted pursuant to Section 19-524-7(b)(2) shall indicate, at a minimum, that the following procedure or practices will be undertaken:

(1) A sign shall be posted at the entrance to the operation, which indicates the name of the permittee and hours of use of the operation; penalty for non-authorized use; necessary safety precautions; and any other pertinent information.

(2) A building roofed and enclosed on all sides or otherwise enclosed to satisfactorily control dust, litter, and other waste materials shall be provided.

(3) Screening shall be provided for a transfer station located within 500 feet of a residence.

(4) The station shall be operated under the close supervision of responsible individuals who have been certified by the Department and who are thoroughly familiar with the requirements and the operational procedures of the transfer station.

(5) Access shall be limited to those times that an attendant is on duty.

(6) There shall be no storage of solid waste in the building or yard for a period greater than 48 [forty-eight] hours, unless otherwise approved by the commissioner.

(7) Unloading of solid waste shall take place only within the enclosed structure and only in approved designated areas.

(8) Solid waste shall be confined to the unloading, loading and handling area.

(9) The transfer station and adjacent area shall be kept clean and free of litter.

(10) Sewage solids or liquids or other toxic or hazardous wastes in quantities detrimental to the normal opera-

tion of the transfer station shall be excluded unless plans for special handling have been submitted to the Department and approved in writing.

(11) Dust generated by the unloading of solid waste and the operation of the transfer station shall be controlled at all times so as to comply with the applicable Administrative Regulations for the Abatement of Air Pollution.

(12) Odor resulting from the unloading of solid waste and the operation of the transfer station shall be controlled at all times so as to comply with the applicable Administrative Regulations for the Abatement of Air Pollution.

(13) No open burning of solid waste shall be conducted except upon compliance with Section 19-508-17, Administrative Regulations for the Abatement of Air Pollution.

(14) Solid waste which is burning or is at a temperature likely to cause fire or is of a highly flammable or explosive nature shall not be accepted in the transfer station.

(15) Equipment shall be provided to control accidental fires and arrangements made with the local fire protection agency to immediately acquire services when needed.

(16) Means shall be provided to control flies, rodents and other insects or vermin.

(17) Provision shall be made for the routine operational maintenance of the transfer station and appurtenances.

(18) If for any reason the transfer station is rendered inoperable, an approved alternative method shall be available for solid waste processing.

(19) Should plans be made for termination of the operation of a transfer station, the permittee shall notify the Department in writing a minimum of 30 days prior to the proposed termination date and shall submit details of proposed alternative methods for solid waste processing and disposal or any further information deemed necessary by the Department.

(20) A minimum of twenty-four (24) hours storage capacity shall be provided for solid wastes in stations which have a design capacity of more than one hundred (100) tons of solid wastes per eight (8) hour day.

(d) Plans for transfer stations which will operate for a period of less than two (2) years submitted pursuant to Section 19-524-7(b)(2) shall contain information the Commissioner shall prescribe through Guidelines.

(e) Measuring procedures. Daily records for transfer stations. Daily records shall be maintained of all solid wastes received at all solid waste transfer stations. The records shall be maintained in a manner acceptable by the commissioner. Such records shall be available for inspection by representatives of the department at any time. Monthly summaries of these records shall be submitted to the department no later than ten (10) days after the last day of each quarter.

(f) Within ninety (90) days of completion of construction, the department shall be furnished with a complete set of as-built drawings of the facility.

Sec. 19-524-8. Bulky waste disposal

(a) Any person wishing to establish a solid waste disposal area specifically for bulky wastes, must obtain approval of the plans and specifications from the Department by issuance of a permit.

(b) An application for a bulky waste disposal area shall include, but need not be limited to the following:

(1) An application form as prescribed by the Commissioner.

(2) A site plan, complete construction plans and specifications of the facility and all appurtenances, and an operation and management plan developed in accordance with applicable guidelines.

(c) The plans submitted pursuant to Section 19-524-8(b) (2) shall indicate, but need not be limited to, that the following procedures or practices shall be undertaken:

(1) Bulky wastes will not be placed so as to contact with either ground or surface water. A minimum of twenty-four (24) inches shall be maintained between the base of deposited bulky wastes and the maximum high water table, unless specifically authorized otherwise by the commissioner.

(2) All bulky wastes shall be spread and compacted upon deposit. The working face of the disposal area shall be so confined as to be easily maintained with available equipment.

(3) Deposited bulky wastes shall be covered weekly or at such more frequent intervals as necessary to prevent fires and the harborage and breeding of vectors.

(4) Access to the disposal area shall be controlled to assure safe and sanitary operation of the facility.

(5) Upon completion of any portion of the operation, said portion shall be closed in accordance with Section 19-524-12 of these regulations.

(d) This regulation does not require separate bulky waste disposal areas to be established. Disposal of bulky wastes at a site operated under Section 19-524-6 of these regulations must comply with that section.

(e) Within ninety (90) days of completion of construction, the department shall be furnished with a complete set of as-built drawings of the facility.

Sec. 19-524-9. Variances

(a) Any owner or operator of a solid waste facility may apply to the Commissioner for a variance from one or more of the provisions of these regulations or guidelines promulgated hereunder. Variance may be sought for design of operation and maintenance procedures and/or temporary operations.

(b) Requests for variance shall be on forms prescribed by the Commissioner and shall supply such information as he requires, including but not limited to:

(1) the nature and location of the solid waste facility.
(2) the reasons for which the variance is required, including the economic, technological and environmental justification.

(3) a description of interim control measures to be taken by the facility in lieu of compliance and any possible damages occurring therefrom.

(4) a specific schedule of measures to be taken to bring the facility into eventual compliance with those regulations from which the variance is sought.

(5) any other relevant information the commissioner may require in order to make a determination regarding the application.

(c) No variance shall be approved unless the applicant shall establish to the commissioner's satisfaction that:

(1) Conditions occurring during the period of variance will protect the public health, the natural resources and environment of the state and control air, water, and land pollution.

(2) Compliance with the regulation would produce practical difficulty or hardship without equal or greater benefits to the public.

(3) A variance may not be granted for a period to exceed two (2) years.

(d) In making a determination on granting a variance, the commissioner shall consider:

(1) the character and degree of injury to or interference with safety, health, natural resources and environment or the reasonable use of property which is caused or threatened to be caused;

(2) the social and economic value of the activity for which the variance is sought;

(3) the suitability of unsuitability of the activity to the area in which it is located.

(4) the impracticability, both scientific and economic, of complying with the regulation from which the variance is sought.

Sec. 19-524-10. Violations

(a) No person shall violate or cause the violation of any applicable regulation.

(b) **Remedies for violations.** (1) The Commissioner shall designate employees of the Department of Environmental Protection who shall, acting with or without complaints, conduct investigations and ascertain whether the Department's regulations are being complied with.

(2) Whenever these employees determine that any regulation promulgated by the Commissioner has been violated or there has been a failure to comply therewith, they shall make and serve upon the person or persons responsible for the violations or failure, a written order specifying the nature of the violation or failure and affording a reasonable period of time for its correction. Nothing herein shall be construed to limit the rights of the commissioner to proceed with any other remedies that he may deem necessary.

(3) Unless the person or persons on whom an order has been served files a written answer thereto with the Commissioner within the time stated in the order and requests a hearing thereon, in accordance with Section 19-524-11 such order shall become final and effective.

Sec. 19-524-11. Hearings

(a) Any person considering himself aggrieved by order of the Commissioner issued pursuant to Section 19-524b, Connecticut General Statutes, may file a written answer and request a hearing in accordance with Section 22a-8-2, Regulations of Connecticut State Agencies.

(b) Any proceeding wherein a hearing is held shall be considered a contested case as defined by Section 4-166, Connecticut General Statutes, and such proceeding shall conform to the requirements of the Connecticut Administrative Procedure Act, Section 4-166 et seq., Connecticut General Statutes.

Sec. 19-524-12. Closing of solid waste facilities

(a) If an owner or permittee intends to close a solid waste disposal facility, he must notify the Commissioner of his intention to do so at least thirty (30) days prior to the closing.

(b) When closing a solid waste disposal area, the regulations governing such closing are 19-524-6(a) (2) concerning grading and seeding; 19-524-6(i) (3) concerning final cover; 19-524-6(j) (2) concerning vector control and 19-524-6(k) concerning decomposition gases.

(c) The Commissioner may require additional construction or information submitted, as he deems necessary, to insure the proper closing of any facility so as to preserve and protect the natural resources and environment of the State of Connecticut.

(d) The Commissioner shall inspect or cause to be inspected all solid waste facilities that have been closed to determine if the closing is complete. He shall notify the owner of a closed solid waste facility if the closing is satisfactory and shall order necessary construction or other steps to be taken to bring unsatisfactory sites into compliance with applicable regulations.

(e) Information concerning the use of the site following closing shall also be submitted to the Commissioner for his approval.

(f) Within ninety (90) days of completion of construction, the department shall be furnished with a complete set of as-built drawings of the facility.

Sec. 19-524-13. Contract approval

The operator of any solid waste facility to receive solid wastes through the provisions of a contract submitted to the commissioner for approval pursuant to section 19-524g of the Connecticut general statutes shall submit the following information to the commissioner:

(a) Information to be submitted if the facility is a disposal area:

(1) Unless previously submitted, a detailed site map showing the proposed final topography of the site. The map shall be developed in conformance with the guidelines prepared pursuant to section 19-524-4b (3) (c) of these regulations.

(2) A topographic survey of all permitted areas which have been filled as of a date no more than six (6) months prior to the date of contract execution. The survey maps shall be developed in conformance with the guidelines prepared pursuant to section 19-524-4b (3) (c) of these regulations.

(3) Daily records of all wastes received at the facility prepared in accordance with section 19-524-6d of these regulations since the topographic survey was made pursuant to section 19-524-13 (a) (2) of these regulations.

(4) Unless previously submitted, all monthly summaries of wastes received from any municipal or other source which may continue to use the site during any part of the proposed contract term. If no summaries are available, copies of contracts, lists of sources and estimates of volumes of all wastes expected to be received during the life of proposed contract shall be submitted.

(5) Any further information deemed by the commissioner to be necessary to determine whether the proposed contract should be approved.

(b) Information to be submitted if the facility is a transfer station, resource recovery facility, or other volume reduction facility:

(1) Daily records of all wastes received at the facility prepared in accordance with section 19-524-7 (e) if the facility is a transfer station, and in accordance with 19-524-14 (d) (1) if the facility is a resource recovery facility.

(2) All information deemed by the commissioner to be necessary to determine whether the proposed contract should be approved.

(c) The commissioner may impose any conditions he deems necessary upon an approval of the contract.

(d) No contract approval shall be effective until all contract parties and the commissioner shall have signed the approval. Such signatures shall constitute an agreement to abide by the terms and conditions therein.

Sec. 19-524-14. Operation and management of solid waste resource recovery facilities

(a) Approval of plans and specifications. Any person wishing to establish a solid waste resource recovery facility must obtain approval of the plans and specifications from the department by issuance of a permit.

(b) Application for permits. An application for a resource recovery facility shall include, but need not be limited to the following:

(1) An application form as prescribed by the commissioner.

(2) Complete engineering plans, specifications on all process equipment, material flow and balance and an operational and management plan developed in accordance with applicable guidelines.

(3) Any additional information requested by the commissioner concerning an application which he determines is necessary.

(c) **Plans and specifications.** The plans for a resource recovery facility which will operate for a period greater

than two (2) years, submitted pursuant to section 19-524-14 (b) (2) shall indicate, at a minimum that the following procedure or practices will be undertaken:

(1) A sign shall be posted at the entrance to the operation, which indicates the name of the permittee and hours of use of the facility; penalty for non-authorized use; necessary safety precautions; and any other pertinent information.

(2) There shall be no storage of solid waste in the facility or yard for a period greater than twenty-four (24) hours except in the event of an emergency when the storage will be limited to the design storage capacity.

(3) Unloading of solid waste shall take place only within the enclosed structure and/or only in approved designated areas.

(4) Solid waste shall be confined to the unloading, loading and handling area.

(5) The facility and adjacent area shall be kept clean and free of litter.

(6) Sewage solids or liquids or other toxic or hazardous wastes as in quantities detrimental to the normal operation of the resource recovery facility shall be excluded unless the facility is designed to handle such materials or plans for the special handling have been submitted to the department and approved in writing.

(7) Dust resulting from the unloading of solid waste and the operation of the resource recovery facility shall be controlled at all times so as to comply with the applicable administrative regulations for the abatement of air pollution.

(8) Odor resulting from the unloading of solid waste and the operation of the resource recovery facility shall be controlled at all times so as to comply with the applicable administrative regulations for the abatement of air pollution.

(9) Equipment shall be provided to control fires and arrangements made with the local fire protection agency to immediately acquire services when needed.

(10) The resource recovery facility design and/or equipment shall provide for explosion protection.

(11) If for any reason the resource recovery facility is rendered inoperable, an approved alternative method shall be available for the processing or transfer and disposal of solid waste.

(d) **Measuring procedures.** (1) Daily records for resource recovery facilities. Daily records shall be maintained of all solid wastes received at all resource recovery facilities. The records shall be maintained by completing forms provided by the commissioner. Such records shall be available for inspection by representatives of the department at any time. Monthly summaries of these records shall be submitted to the department no later than ten (10) days after the last day of each quarter.

(e) Within ninety (90) days of completion of construction, the department shall be furnished with a complete set of as-built drawings of the facility.

Be it known that the foregoing regulations are amended as hereinabove stated by the aforesaid agency pursuant to section 19-524C of the general statutes, after publication in the Connecticut Law Journal on September 6, 1977, of the notice of the proposal to amend such regulations, and the holding of an advertised public hearing on the 11th day of October, 1977.

Wherefore, the foregoing regulations are hereby amended as hereinabove stated, effective when filed with the Secretary of the State.

In Witness Whereof: October 24, 1977, Stanley J. Pac, Commissioner.

About the Team

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a variety of federal, state, and regional agencies. Specialists on the Team include geologists, biologists, foresters, climatologists, soil scientists, landscape architects, archeologists, recreation specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area.

The Team is available as a public service at no cost to Connecticut towns.

PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in reviewing a wide range of projects including subdivisions, sanitary landfills, commercial and industrial developments, sand and gravel operations, elderly housing, recreation/open space projects, watershed studies and resource inventories.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision-making. This is done through identifying the natural resource base of the project site and highlighting opportunities and limitations for the proposed land use.

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected officials of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the Chairman of your local Soil and Water Conservation District. This request letter should include a summary of the proposed project, a location map of the project site, written permission from the landowner allowing the Team to enter the property for purposes of review, and a statement identifying the specific areas of concern the Team should address. When this request is approved by the local Soil and Water Conservation District and the Eastern Connecticut RC&D Executive Council, the Team will undertake the review on a priority basis.

For additional information regarding the Environmental Review Team, please contact Jeanne Shelburn (889-2324), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360.

